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PATROL I Rpts

addendum attd to end of rpt.

RESEARCH MEMORANDUM

INSTRUCTOR'S GUIDE
PATROL I
Land Navigation: Basic Instruction

By

Staff, U.S. Army Infantry Human Research Unit

December 1958

U.S. Army Infantry Human Research Unit
Fort Benning, Georgia

Under the Technical Supervision of

The George Washington University
HUMAN RESOURCES RESEARCH OFFICE
operating under contract with
THE DEPARTMENT OF THE ARMY

Each transmittal of this document outside the Department of Defense must have prior approval of the Chief of Research and Development, Department of the Army.

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RESEARCH MEMORANDUM

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PATROL I.
Land Navigation: Basic Instruction.

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(11) December 1958

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Approved:

PRESTON S. ABBOTT
Director of Research

U.S. Army Infantry
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Fort Benning, Georgia

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COMPOSITION OF THE RESEARCH TEAM

Composition of the Subtask PATROL I staff concerned with the research activity reported was as follows: Mr. Joseph F. Follettie, Task Leader; Mr. Henry S. Rosenquist, Mr. Frank L. Brown, SP 5 Charles F. Maloney,* PFC Martin M. Mintz,* and PFC Francis J. Tomczkowski.*

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FIGURES

PREFACE

This Research Memorandum represents an experimental program of basic instruction in land navigation under day and night visibility conditions. The program stresses the acquisition of a degree of skill appropriate to the Basic Individual Combat Training level. The report contains three inclosures: an Instructor's Guide, May 1958; an Addendum; and a Film Slide Supplement.

Based on the Instructor's Guide prepared under Subtask Patrol I at the U. S. Army Infantry Human Research Unit, training was conducted at Fort Benning, Georgia, during the spring of 1958. The test which was developed to evaluate the effectiveness of this training is described in a separate research memorandum. Both memoranda can be considered as technical supplementary material to the Subtask Patrol I final report to be published as a Technical Report.

Included in the Instructor's Guide are descriptions of the instruction, training aids, physical facilities required for training, a subject schedule and detailed lesson plans for the conduct of the training.

The attached addendum to the guide represents minor changes to be posted as a result of suggestions by U. S. Army Infantry School, observations made by Infantry Human Research Unit personnel, and typographical errors.

The Film Slide Supplement accompanies the description of the slides listed in Appendix II of the Instructor's Guide. Its purpose is to expedite reproduction of the film slides for future training purposes.

PATROL I: LAND NAVIGATION

CHAPTER 1

INTRODUCTION

1. Purpose and Scope

a. The purpose of Subtask PATROL 1 is to develop a program of instruction in land navigation under day and night visibility conditions which stresses acquisition of a degree of skill appropriate to the Basic Individual Combat Training level.

b. This guide presents, in detail, a program of instruction in elementary land navigation. It includes descriptions of the instruction, training aids, and physical facilities required for training. Also included are a subject schedule and detailed lesson plans for the conduct of training.

2. Land Navigation Concepts

a. Mission Context

(1) The typical mission requiring elementary land navigation skill occurs in the defensive space of a BCCID division in a position defense.

(2) The most typical locus of the typical mission requiring elementary land navigation skill is intra-battle group.

(3) The most typical moves in the performance of a typical mission requiring elementary land navigation skill occur between the battle group CP and the various company CP's, to include attached company-strength units, of the battle group.

(4) Terrain characterizing the space in which a typical mission requiring elementary land navigation skill is discharged is uninhabited countryside having:

(a) Few, if any, cultural features.

(b) Neither a great preponderance nor a complete absence of useful, easily identified terrain features.

(c) Sparse to moderate vegetation.

b. Types of Missions

Typical moves involve the following types of missions, in order of frequency of occurrence:

(1) Installation and maintenance of field telephone wire system.

(2) Scheduled and special messenger service.

(3) Evacuation of sick and wounded.

(4) Engineer reconnaissance (attached Engineer Combat Company).

(5) Evacuation of prisoners of war.

(6) Reconnaissance of area in rear of forward edge of battle area (FEBA) by reserve units.

(7) Reconnaissance for and initial occupation of the position.

(8) Personnel replacements.

(NOTE: While missions requiring elementary land navigation skill at intra-company level, particularly those pertaining to Class I, II, IV, and V supply and lateral contact, are more numerous than many of the typical move missions, intra-company moves are so short and lateral extents of objectives so great in relation that the navigation skill requirement for such moves is of trivial magnitude.)

c. Supervisory Personnel and Equipment

(1) Personnel assigning the typical mission and giving preparatory instructions to the performing unit are, in order of frequency of utilization:

(a) Wire Foreman, SFC, MOS 311.60

(b) Chief Message Clerk, SP2, MOS 311.2

(c) Company Aid Man, SP2, MOS 911.10

(d) CO or Exec O, Company Level, Capt or 1st Lt, MOS 1542

(e) First Sergeant, E/Sgt, 001.80

(f) Platoon Sgt or Squad Leader, E/Sgt or SFC MOS 121.70 or 121.60

(g) Sergeant Major, First Sergeant, E/Sgt, 001.90 or 001.80

(2) Equipment available to supervisory personnel, for use in preparing performers for discharge of typical mission requiring elementary land navigation skill, includes topographic relief maps and lensatic compasses.

(3) Supervisory personnel will assign missions, select the route to be traversed, and compute and transmit the azimuths and d distances relating to the route.

d. Performing Personnel and Equipment

(1) The performing unit responsible for a typical mission requiring elementary land navigation skill is two or more individuals in the E-3 and/or E-4 grades, e.g. a wire team.

(2) Equipment available, for use by the performing unit during discharge of a typical mission requiring elementary land navigation skill, includes compasses.

(NOTE: Sample notes in addition to azimuths and distances may be provided where time and the tactical situation permit. It is not expected that maps ordinarily will be available for performers of missions at this level; however, maps retained by supervisors may be available for brief study by performers prior to departure.)

(3) The term personal combat equipment covers all other uniform and equipment requirements with respect to performing personnel.

CHAPTER 2

DESCRIPTION OF THE COURSE

1. Purpose and Scope, by Periods of Instruction

A brief description of each Period of Instruction is given below. Each description covers purpose and scope. Detailed descriptions of each Period may be found in Appendix I.

a. Period One: Use of the Compass (2 hrs)

(1) Purpose. To instruct the student through conference, demonstration, and practical exercise in the use of the compass.

(2) Scope

(a) Section I. Conference and demonstration in the procedures of holding, reading, and sighting the compass, including practical drill in principles of holding the compass.

(b) Section IIA. Instructions and practical drill in procedure of reading and sighting the compass.

(c) Section IIB. Supplementary instruction and practical drill in principles of sighting and reading the compass, restricted to students demonstrating high proficiency on Section IIA training.

b. Period Two: Dead Reckoning (4 hrs)

(1) Purpose. To impart, through instruction and practical exercise, understanding of principles governing the dead reckoning navigation process, namely, determining and maintaining direction and distance in the field.

(2) Scope

(a) Section I (15 min). Instruction in the function and selection of steering marks as a guide to dead reckoning.

(b) Section II (20 min). Practical exercise in application of steering mark selection and use in aiding navigator to maintain direction.

(c) Section III (50 min). Instruction in distance determination and maintenance, detouring, compensation, and special problems.

(d) Section IV (35 min). Practical exercise in distance determination by establishment of individual standards.

(e) Section V (30 min). Practical exercise in the application of detouring principles, in the presence of steering marks and in the absence of steering marks.

(f) Section VI (50 min). Practical exercise in the application of principles of dead reckoning; maintaining distances and direction.

c. Period Three: Map Using (2 hrs)

(1) Purpose. To provide the basic trainee with elementary knowledge of map reading and recognition of checkpoints.

(2) Scope

(a) First hour. Map symbol recognition, contour interpretation, map distance measurement.

(b) Second hour. Checkpoint types and clarity, map orientation.

d. Period Four: Map-Terrain Association (2 hrs)

(1) Purpose. To impart, through limited critiqued practical exercise, understanding of principles governing ground recognition of map-selected terrain features and their utilization as checkpoints during land navigation.

(2) Scope. Application of principles governing map-terrain association; recognition of terrain symbols on the ground and on the map, by study of 8 selected points in the field.

e. Period Five N: Night Land Navigation Exercise (2 hrs)

(1) Purpose. To impart, through critiqued practical application under conditions of limited visibility, limited skill in land navigation over unfamiliar terrain based upon a combination of dead reckoning and terrain recognition derived from map study.

(2) Scope.. Training aims to elicit responses based on all principles and skills to which the student has been exposed during previous navigation training. After orientation and briefing, 2-man teams navigate from a starting point to an objective

300-600 meters distant and are critiqued on performance prior to navigation to a second objective over a similar distance. No maps or lights are employed by the students during navigation.

CHAPTER 3

CONDUCT OF TRAINING

SECTION I

DEVELOPMENT OF INSTRUCTION

1. Role of the Guide

a. Much of the instruction contained in the PATROL I POI (May 1956) departs from conventional Army instruction. For this reason, instructors should rely on subject matter contained in the detailed lesson plans in App I.

b. The lesson plans are designed as a detailed guide to insure coverage of the skills and knowledge required of the student. While the planning of the lesson is the primary responsibility of the instructor (par 26, FM 21-6, Techniques of Military Instruction), availability of lesson plans supplies him with blueprints designed to facilitate maximum practice, relieves him of much administrative burden, and permits channeling of major effort into mastery of subject matter and techniques of instruction. The value of this type of lesson plan, particularly in the teaching of basic subjects during mobilization, is obvious.

2. Implementation of Instruction

a. The lesson plans set forth in App I and the training facilities described in App III were designed to accommodate 80 men. Where local factors of time and numerical student strength warrant, lesson plans and training facilities must be adjusted to fit these requirements.

b. If during repeated administrations of the instruction, variations or modifications of the content, training aids, or physical facilities appear to be necessary, such changes should be issued as addenda to this publication to preclude distortion of the closely integrated subject matter of the POI.

c. The subject schedule in paragraph 7 is published as a guide for scheduling the POI.

3. General Principles of Training

In the conduct of training, certain well-established

principles should be followed. The principles listed below are applied in the PATROL I POI.

a. Transfer. Transfer occurs when training in one task favorably affects performance in another.

b. Motivation. Learning will take place more rapidly when the soldier is instilled with a desire to learn and realizes the importance of the task being taught as related to his individual responsibilities and the mission of his unit.

c. Knowledge of Results. The soldier should receive immediate information concerning the results of his efforts; that such evidence be visible and concrete is highly desirable.

d. Organization (Integration). Where the performance of simple motor skills which are topographically or otherwise receptively dissimilar ultimately must be combined into the performance of a complex activity which features both simultaneous and successive arrangement, over time and space, of several of the simple skills elements, the simple skills should first be mastered in relative isolation. Thereafter, the simple skills should be progressively combined (organized, integrated) toward the goal of performance of the complex activity.

e. Accuracy or Speed. The emphasis on accuracy or speed should be determined by the importance each plays in the final performance of the task to be learned.

f. Repetition. It is necessary for the soldier to practice an act to learn it efficiently; once learned, additional properly spaced and varied practice in the activity is essential to the maintenance of a satisfactory standard of combat level proficiency.

g. Fatigue. Fatigue retards the learning process.

h. Variety. It is best to vary the material to be learned so that boredom and fatigue are reduced and motivation increased, but variation must be logical, with interrelated material of progressive difficulty pointed to the final objective.

4. Method of Instruction

The following sequence is used in the PATROL I POI:

a. The soldier is given a brief explanation and/or demonstration of a certain principle or exercise.

b. He is then required to perform the exercise or to apply the principle in a carefully controlled situation.

c. The soldier receives information concerning performance accuracy with minimum delay, often immediately following performance of the act. This is accomplished by: (1) transmission of information concerning accuracy of performance is built into the training facility, and/or (2) the soldier is critiqued following performance.

(NOTE: Critiquing has two purposes: to inform as to accuracy of performance and to indicate correct procedure if necessary.)

d. A repetitive drill procedure is used whereby, following initial performance and any required correction, the soldier executes a variation of the same problem. Procedure may be repeated several times, with progressive comparison of previous and consequent performance. During repetitive drill in the classroom, for example, instructors direct a show of hands as reaction to a slide-depicted problem. Numbered, multiple choice answers appear on the slide. When 80 per cent of the class has reacted by making entries on individual answer sheets, a student is named to indicate his choice number. The instructor then indicates the correct number of the answer and briefly explains the principles upon which the answer was based. The use of numbers as references to answers, pacing the class to 80 per cent minimum reaction, and use of simply stated principles (as opposed to longer student-instructor discussions) increases time available for repetition.

e. When the soldier has mastered simpler exercises, which when taken together in a proper arrangement over space and time constitute a more complex exercise, he is required to perform the more complex exercise. Thus, the student encounters progressive integration of principles and skills. This emphasis culminates in an exercise wherein the soldier executes a night navigation mission of intermediate difficulty. In this exercise, opportunity is afforded to bring all elements of preparatory training into play in their proper arrangement over time and space.

5. Evaluation of Instruction

Training without evaluation of consequent proficiency in

the criterion activity can result in unsatisfactory standards concerning adequacy of instructional content, of instructor proficiency, or both. Proficiency Test Manual, PATROL I - Land Navigation, dated May 1956, is provided for this purpose.

SECTION II

CADRE TRAINING AND SUBJECT SCHEDULE

6. General Procedures for Cadre Training

The training coordinator, a commissioned officer, is responsible for the selection and training of cadre and for ultimate administration of the training. He has the following specific responsibilities:

a. Selection of a training cadre (principal instructors and assistant instructors) and supporting personnel, based on a preliminary reading of the Instructor's Guide.

b. Supervision of a preliminary reading, by the training cadre, of the Instructor's Guide (for purposes of familiarization).

c. Assignment of training cadre to periods of instruction and primary and secondary jobs.

(NOTE: Every cadreman should be familiar with what has been taught in periods prior to those assigned him or periods following those assigned him. In addition, he should be sufficiently well trained in a secondary job to substitute in event of illness or other disruptive factor.)

d. Supervision of specialized reading, by the training cadre, of those portions of the Instructor's Guide for which each cadreman has primary or secondary job responsibility.

(NOTE: Every cadreman should be thoroughly familiar with all aspects of every period for which he has a primary or secondary job responsibility. Otherwise, he will not be able to impress upon the trainee that he really knows what is going on.)

e. Coordination of development of training aids and field physical facilities, familiarization with the layout of field physical facilities on the ground, and familiarity with the state of readiness of training aids and field facilities.

f. Planning a schedule for rehearsing the training cadre on their assigned periods.

(NOTE: All periods must be rehearsed.)

g. Rehearsing the training cadre.

(NOTE: All rehearsals should occur as nearly as possible under comparable conditions to those used during administration of training. Wherever possible, the training facility to be used during training should be used during rehearsal. Rehearsals should occur according to the visibility conditions of training, that is, during day for day periods and during night for night periods. All necessary training aids should be present. If a committee system is employed, as many members of the committee should be present as can be obtained, even though some committee members will not have primary or secondary job responsibilities for the period being rehearsed. This procedure will insure a satisfactory overview of the POI on the part of all members of the training cadre.)

(1) Training cadre should rehearse both their primary and their secondary jobs.

(2) One criterion of readiness to give the training is complete familiarity with the subject matter, as demonstrated by ability to follow procedures given in the lesson plan, explain use of relevant training aids, describe the facility used, and answer any questions raised by others concerning training objectives. A good system for rehearsing is the two-team procedure, wherein one team takes the training and another acts as the training cadre responsible for supervision of the period, teams reversing roles following each complete administration of the period.

(3) A second criterion of readiness to give the training is familiarity with procedures given in FM 21-6, Techniques of Military Instruction. The instructor's delivery should be expressive and enthusiastic. He should communicate to the trainee that he is utterly at home in the professional role of instructor.

(4) When rehearsals do not conform to expectations based on aforementioned criteria of readiness to give training, they should be rescheduled and repeated to whatever extent is necessary to meet these criteria.

(5) The narrative is provided in outline form. The instructor must cover all points listed, but he is encouraged to employ his own terminology to express them.

7. Subject Schedule for PATROL I POI (12 hrs)

(NOTE: Sequence of training is indicated by period numbers. Period numbers which are followed by N occur at night.)

P*	H*	Lesson	Text References	Training Area
1	2	Use of the compass	FM 21-26, par 52 and Chapter 11	Classroom building with adjacent training field
2	4	Dead reckoning	FM 21-26, par 52, p 126-129, 133, 136, 137, 141, 142	"Area C"
3	2	Map using	FM 21-26 Chapter 2	Classroom building
4	2	Map-terrain association	FM 21-26, Chapter 2; Instructor's Guide, PATROL I, May 1958, Period 3	"Move Road Area"
5N	2	Night land navigation exercise	FM 21-26, par 52 p 126-129, 133, 136, 137, 141, 142; Instructor's Guide, PATROL I, May 1958, Periods 1-4	"Move Road Area"

*P-Period

*H-Hours

(NOTE: For reference to training aids and equipment in each period, see Appendix II.)

CHAPTER 4

TRAINING AIDS AND FIELD PHYSICAL FACILITIES

SECTION I

TRAINING AIDS

1. General

a. In the selection of training aids for use in the PATROL I PCI, effort was made to employ, insofar as practicable, standard items of troop issue already stocked by United States Army Technical Services. Employment of training aids is described in lesson plans (App I). Detailed directions for construction of specially designed training aids appear in Appendix II.

b. The training aids have been designed primarily for presentation before 80 students. In classroom instruction the major aids consist of projected slides; in the field, maps and graphic charts predominate.

SECTION II

FIELD PHYSICAL FACILITIES

2. General

The facilities prescribed are designed for the use of 80 students at a time. Standard materials are used whenever practicable. Facilities consist mainly of ground markers arranged in various patterns. These stakes and panels are located precisely by survey methods. Detailed directions for construction of facilities appear in Appendix III.

INSTRUCTOR'S GUIDE

PATROL I

LAND NAVIGATION: BASIC INSTRUCTION

APPENDIX I

LESSON PLANS

U.S. Army Infantry
Human Research Unit
Fort Benning, Georgia
May 1958

PATROL I: LAND NAVIGATION

LESSON PLAN

PERIOD ONE

USE OF THE COMPASS

HOUR:	1, 2, of 12
INSTRUCTION TIME:	120 minutes
PURPOSE:	To provide instruction and practice in the procedures of holding, reading, and sighting the compass
INSTRUCTOR REFERENCES:	Instructor's Guide, PATROL I, May 1958, Chap 1-4, Pt 21-26, Par 52, Chap 11
TRAINING AIDS:	See Lesson Plan, Secs I and II.
STUDENT UNIFORM AND EQUIPMENT:	Uniform DL 1 Compass, Lensatic 1 Pencil 1 Notebook (NOTE: Prior to issue of compasses to trainees, all compasses must be checked for accuracy. See App II, Sec I.)
PHYSICAL FACILITIES:	1 Classroom (See Sec I) 1 Training Field (See Sec II)
PERSONNEL:	1 Principal Instructor (PI) 9 Assistant Instructors (AIs)
SAFETY FACTORS:	Local regulations applicable.
ORGANIZATION:	See Lesson Plan, Secs I and II
TRANSPORTATION:	As required

TIME BREAKDOWN

Time in Minutes	Type of Instruction	Subject
50	C, D, PE	Section I. Use of the compass: holding, reading, and sighting procedures
10	—	BREAK
50	C, D, PE	Section II. Sighting and reading, instruction, drill
10	—	BREAK

SECTION I

USE OF THE COMPASS

HOUR: 1 of 12

PURPOSE: To instruct trainees in proper procedures of holding, reading and sighting the compass.

TRAINING AIDS:
1 Overhead projector (1000 watt)
IH 637 "Master Vu-Graph"
40 Film slides: Period One
1 Compass, lensatic (for PI)
1 Roster of students
2 Answer Sheets per student
(See App II, Sec I)

PHYSICAL FACILITIES:
1 Classroom equipped with:
1 Chair and desk (or table) for each student
1 Instructor's pointer (five ft)
1 Instructor's lectern with lamp
Blackout curtains or opaque shades for windows
Screen (for projection of slides)

PERSONNEL:
1 Principal Instructor (PI)
1 Assistant Instructor (AI) for each 40 students
1 Projector operator

ORGANIZATION: Students seated at desk or tables at the beginning of class. Answer sheets on desks before students. AIs dispersed about classroom to aid as required.

TIME BREAKDOWN:

Time in Minutes	Type of Instruction	Subject
2	C, D	Introduction and purpose
18	C, D, PE	Holding the compass
20	C, D, PE	Reading the scale
4	C, D	Sighting procedure
5	C, D	Summary
1	C	Administration
10	—	BREAK

LESSON OUTLINE

SECTION I

(NOTE: Students seated. Lights out in classroom. The identifying slide /no index number/ is shown for 15 seconds without comment.)

1. Introduction and Purpose (2 min)

a. Slide C-1. Title: The Mission

"In combat it is essential that you, the individual soldier, know your location on the battlefield and know how to move accurately and rapidly from one location to another over unfamiliar ground during visibility conditions ranging from full visibility to foggy night."

b. "Suppose you are at a point here (POINT to 'x-start') on this map and your mission is to travel on foot to this objective (POINT to 'Objective') more than one mile away over uninhabited countryside. You will perform such a mission during this training."

c. "How do you get there? (PAUSE) The answer is Land Navigation. Land Navigation can be defined as accurate movement over unfamiliar ground. In this course we will deal only with foot travel."

d. Slide C-2. Title: Equipment

"What equipment is useful? (PAUSE) First, a compass is useful to aid you to maintain direction (POINT); a map, if one is available, with the route drawn on it (POINT); a card with the correct route information (POINT); a pencil (POINT); and an aid to permit recording distence count. In this course we use a tent rope or shoestring. (POINT)."

e. "This is the beginning of a course in Land Navigation. The use of the compass will be covered first."

(NOTE: All underlined material under major headings should be repeated to emphasize these points.)

2. Holding the Compass (18 min)

a. Position of the Compass and Movable Parts in Relation to the Navigator (4 min)

(1) Slide C-3. Title. Position of the Compass

(a) "The use of the compass involves the skills of holding, reading, and sighting."

(b) "In holding, the movable parts of the compass must be in their correct positions."

(c) "The front cover (POINT) is raised perpendicular by day."

(d) "The eyepiece (POINT) is raised at an angle."

(2) Slide C-4. Title: Position of the Cover at Night

"At night the cover (POINT) is extended out flat."

(3) Slide C-5. Title: Position of the Hand

(a) "The compass must be held in the correct position by the navigator."

(b) "The thumb (POINT) is placed through the ring."

(c) "The index finger (POINT) is placed around the front of the bowl."

(4) Slide C-6. Title: Position of the Free Hand

"The free hand (POINT) is used to steady the compass."

(5) Slide C-7. Title: Eyepiece Placed Close to the Eye

"The eyepiece (POINT) is placed close to the eye."

(6) Slide C-8. Title: Focusing the Reading Glass

"The reading glass (POINT) is focused by moving both the eye and the eyepiece together."

(7) Slide C-9. Title: Reducing Glare

"Glare from the cover glass is reduced by shading with the free hand (POINT). Light causing the glare comes from the front as well as overhead."

(8) Slide C-10. Title: Keeping the Compass Level

(a) "In holding, the compass must be kept level."

(b) "The dial (POINT) must be kept parallel to the rim of the cover glass and at a point midway between the top and bottom of the bowl."

(c) "If the dial is not kept level, it will stick to the bottom of the bowl or to the cover glass."

b. Slide Drill in Holding (6 min)

(NOTE: Blank answer sheets are placed on each desk prior to class.)

(1) Slide C-11. Drill

(a) Procedure

"Print your name on the answer sheet marked 'Slide Drill in Holding.' The following slides show the compass being used incorrectly. Each slide shown will have four answers lettered a, b, c, and d. You will answer the question by circling

the corresponding letter to the correct answer on your answer sheet. When the correct answer is given, if you have circled the wrong letter, do not erase it, but make an 'X' over it and circle the correct letter. After the drill, you will exchange papers to score them. The first slide is C-11. Circle one of the four letters. When you have circled your answer, raise your hand. I will call on one of you for the answer."

(NOTE: When about 80% of the class have raised their hands, instruct the class to stop work and lay down their pencils. Call on one or more individuals for their answers.)

(b) "What's wrong?"

(a) Eye too far from eyepiece

(b) Compass is backwards

(c) Compass not level

(d) Nothing is wrong

(c) (After response) "'a' is the right answer."

(d) "The eyepiece should be placed close to the eye."

(NOTE: The four alternatives for the remaining drill are the same as the first slide.

(2) Slide C-12. Drill

(a) "What's wrong?"

(b) "Answer this question in the same way."

(c) (After response) "'b' is correct."

(d) "The compass is not being held level."

(3) Slide C-13. Drill

(a) "What's wrong?"

(b) (After response) "'b' is correct."

(c) "The compass is not being held level, because

the dial is touching the cover glass."

(4) Slide C-14. Drill

(a) "What's wrong?"

(b) (After response) "'d' is correct."

(c) "Nothing is wrong. The compass is being held correctly."

(5) Slide C-15. Drill

(a) "What's wrong?"

(b) (After response) "'b' is correct."

(c) "The compass is not being held level."

(6) Slide C-16. Drill

(a) "What's wrong?"

(b) (After response) "'b' is correct."

(c) "The compass is not being held level. The dial is touching the bottom of the bowl."

(7) Slide C-17. Drill

(a) "What's wrong?"

(b) (After response) "'c' is correct."

(c) "The compass is backwards. The eyepiece goes close to the eye and the cover should be at the front."

(8) Slide C-18. Drill

(a) "What's wrong?"

(b) (After response) "'b' is correct."

(c) "The compass is not being held level."

(9) Scoring

"Exchange answer sheets with the man next to you.

Count up all the 'Xs' and mark that total on the top of the answer sheet. After you have finished scoring, pass the answer sheets to the front and the AIs will collect them."

(NOTE: AIs will collect the answer sheets from the front row.)

c. Practical Drill in Holding the Compass (8 min)

(NOTE: Lights on during drill.)

(1) Opening the Compass

(NOTE: The PI will have a compass and demonstrate these movements while explaining them.)

"Take out your compasses. Lift the wire ring and rotate it under the compass. Next, lift the front cover to the day position. Then raise the eyepiece."

(2) Effects of Metal

(a) "The compass must be kept away from disturbing forces."

(b) "The compass must be kept away from iron and its alloys."

(c) "The dial of the compass is attached to a magnetic bar one end of which always points to the iron deposits near the North Pole. Other iron will also attract the magnetic bar."

(d) "The compass must be kept away from electrical fields."

(e) "Electrical fields, such as those set up by high power lines and radio sets, also attract the magnetic bar of the compass."

(f) "Place the compass on the desk and bring some metal near it. Observe the attraction caused by the metal."

(3) Organization

"The class will be divided into buddy-pairs and then we will have a standing drill on holding the compass. (After organization) When I give the instructions, the left-hand man of

each buddy-pair will become a coach and the other man the pupil. The coach will help the pupil do the right thing. Later, you will trade jobs. The AIs will be watching your work to make corrections. If a pair desires assistance hold up your hands and an AI will come to you. Everyone rise, with the compass. Pupils hold the compass in the correct position."

(4) Procedure

"Coaches, check your pupil for proper performance as each of the following points is called off:

(a) The front cover is raised perpendicular.

(b) The eyepiece is raised at an angle.

(c) The thumb is through the wire ring.

(d) The index finger is around the front of the bowl.

(e) The eyepiece is placed close to the eye.

(f) The compass is being held level."

(5) Repetition

"The coach and pupil will change jobs now and the checklist will be run through again. At the end, be seated."

(6) Closing the Compass

"Now we will close the compasses."

(NOTE: The PI will again demonstrate the movements of closing the compass while instructing the students.)

"Push the eyepiece down flat against the cover glass. Next, overlap the eyepiece and the bowl with the front cover. Then pull the wire ring up and snap it into place locking the compass."

3. Reading the Scale (20 min)

(NOTE: Lights out.)

a. The Face and the Luminous Area of the Compass (8 min)

(1) Slide C-19. Title: The Face of the Compass

(a) "In reading the compass, the correct scale on the dial must be used."

(b) "The inner, or 360°, scale (POINT) is used."

(c) "The outer, mil, scale (POINT) is not used in Land Navigation."

(d) "The 360° scale must be read correctly. The following will show you how to do this."

(e) "The 360° reading which is also the 0° reading is not numbered but marked by the luminous arrow."

(f) "The 360° scale is numbered every 20 degrees (POINT) clockwise around the dial."

(g) "Each tick mark (POINT) is 5 degrees from the next (POINT)."

(h) "The long tick marks are degrees ending in 0." (POINT to and read aloud examples.)

(i) "The short tick marks are degrees ending in 5." (POINT to and read aloud examples.)

(j) "The degrees are read through the reading glass directly under the index line." (POINT)

(k) "Read the compass to the nearest 5° tick mark."

(l) "Direction given in degrees is called an azimuth."

(m) "The yellow lines (POINT) on the cover glass are not used and are placed out of the way by turning the cover glass with the lines towards the eyepiece."

(2) Slide C-20. Title: The Luminous Area

(a) "At night the scale is more difficult to read."

(b) "The scale at night is read against the background of this luminous area (POINT) painted on the front and bottom of the bowl below the index line."

(c) "The scale can be accurately read at night if it is remembered that between the North arrow and East there are four numbered degree marks; between East and South there are four numbered degree marks with South marked by 180°; between South and West and West and the North arrow, there are also four numbered degree marks."

b. Slide Drill in Reading (10 min)

(1) Slide C-21. Drill

(a) Procedure

"Print your name on the answer sheet marked 'Slide Drill in Reading.' Some slides will now be shown of the dial at different degree readings. Each slide will show four choices lettered a, b, c, and d. Answer these questions as you did the drill on holding, by circling the letter on your answer sheet that corresponds with the letter of the answer you chose on the slide. The answer sheets will be corrected in the same way after the drill. Put an 'X' over any wrong answer. After you have exchanged answer sheets, count the 'Xs' and enter the total at the top of the answer sheet. Then pass the answer sheets to the front as you did in the holding drill. The first slide is C-21. Circle one of the four letters. When you have circled your choice raise your hand, and put down your pencils."

(NOTE: When about 90% of the class have raised their hands, give the correct answer.)

(b) "Which direction in degrees?"

(a) 90° (c) 64°

(b) 360° (d) 180°

(c) "Now answer the question."

(d) "The correct answer is 'b', 360°."

(NOTE: The remaining drill slides are answered as the first.)

(2) Slide C-22. Drill

(a) "Which direction?"

(a) 280° (c) 285°

(b) 275° (d) 110°

(b) "The correct answer is 'a', 220°."

(3) Slide C-23. Drill

(a) "Which direction?"

(a) 130° (c) 135°

(b) 140° (d) 24°

(b) "The correct answer is 'c', 135°."

(4) Slide C-24. Drill

(a) "Which direction?"

(a) 65° (c) 75°

(b) 80° (d) 70°

(b) "The correct answer is 'd', 70°."

(5) Slide C-25. Drill

(a) "Which direction?"

(a) 270° (c) 265°

(b) 255° (d) 260°

(b) "The correct answer is 'c', 265°."

(6) Slide C-26. Drill

(a) "Which direction?"

(a) 330° (c) 325°

(b) 320° (d) 335°

(b) "The correct answer is 'a', 330°."

(7) Slide C-27. Drill

(a) "Which direction?"

(a) 40° (c) 35°

(b) 45° (d) 50°

(b) "The correct answer is 'b', 45°."

(8) Slide C-28. Drill

(a) "Which direction?"

(a) 125° (c) 120°
(b) 21° (d) 115°

(b) "The correct answer is 'c', 120°."

(9) Slide C-29. Drill

(a) "Which direction?"

(a) 225° (c) 235°
(b) 230° (d) 41°

(b) "The correct answer is 'b', 230°."

(10) Slide C-30. Drill

(a) "Which direction?"

(a) 285° (c) 290°
(b) 295° (d) 300°

(b) "The correct answer is 'b', 295°."

(11) Slide C-31. Drill

(a) "Which direction?"

(a) 140° (c) 145°
(b) 155° (d) 150°

(b) "The correct answer is 'd', 150°."

(12) Slide C-32. Drill

(a) "Which direction?"

(a) 215° (c) 210°
(b) 38° (d) 220°

(b) "The correct answer is 'a', 215°."

(13) "This is the last drill slide. Exchange papers and score them."

(NOTE: PI will pause for about 30 seconds while scoring is being done. After the answer sheets have been scored and passed forward, the AIs will collect them.)

c. Locating Assigned Azimuths (2 min)

(1) Slide C-33. Title: Locating an Assigned Azimuth

(a) "We will now continue with the instruction."

(b) "When given an azimuth, the navigator rotates his body until the compass tick mark lies directly under the index line."

(c) "While rotating the body, the compass (POINT) must be held in the correct reading position."

(2) Slide C-34. Title: The Navigator Rotates

"The navigator's first azimuth was 360°. He rotated his body, holding the compass in the correct position until the assigned azimuth, 215°, lay directly under the index line."

(3) Slide C-35. Title: Facing a New Assigned Azimuth

"His next azimuth is 155°. He followed the same movements to face in the new assigned direction (POINT)."

4. Sighting (4 min)

a. Procedure

(1) Slide C-36. Title: Day Sighting

"During the day the navigator first looks through the sight slot (POINT) and then along the sight wire (POINT) to some easily recognizable object on the ground in the distance."

(2) Slide C-37. Title: Night Sighting

"At night the navigator looks first over the sight slot (POINT) and then along the imaginary line formed by the luminous dots (POINT) to some easily recognizable object in the

distance. Note that the cover is in the night position."

(3) Slide C-36. Title: Luminous Dots at Night

"This slide shows a view of how it would look to the navigator looking over the sight slot (POINT) and along the imaginary line (POINT) formed by the luminous dots."

5. Questions

(NOTE: If time permits, the following questions may be employed as a review prior to the summary. The PI should state the question, pause to allow for mental formulation of an answer, then designate a student by name from the roster to answer the question.)

a. Holding

(1) What is the position of the front cover by day?

Answer: The front cover is raised perpendicular by day.

(2) What is the position of the eyepiece?

Answer: The eyepiece is raised at an angle.

(3) Why must the compass be held level?

Answer: If the compass is not held level the dial will stick to the bottom of the bowl or to the cover glass.

b. Reading

(1) What scale on the dial is used in Land Navigation?

Answer: The inner, or 360°, scale is used.

(2) How is the degree scale read when the compass is used properly?

Answer: The degrees are read through the reading glass directly under the index line.

(3) How many degrees apart is one tick mark from the next?

Answer: The tick marks are 5 degrees apart.

(4) How can the scale be read at night?

Answer: The scale at night is read against the background of the luminous area of the compass.

c. Sighting

(1) What is the sighting procedure by day?

Answer: During the day the navigator first looks through the sight slot and then along the sight wire.

(2) What is the night sighting procedure?

Answer: At night the navigator looks first over the sight slot and then along the imaginary line formed by the luminous dots.

6. Summary (5 min)

(NOTE: Instruct students to take out their compasses and perform the operations of holding stressed in the summary.)

a. Holding and Reading

(1) Slide C-39. Title: Proper Use of the Compass

"When given an azimuth mission, the navigator:

(a) Holds the compass in the correct day position by placing his thumb through the ring (POINT), putting his index finger around the front of the bowl (POINT), and placing the eyepiece close to the eye (POINT). He steadies the compass with his free hand, keeping the compass level.

(NOTE: After summary on holding instruct students to put away their compasses.)

(b) Looks through the reading glass to the 360° scale (trace dotted line from eye to cover glass with pointer).

(c) Rotates his body till the correct azimuth lies directly under the index line."

b. Sighting

(1) Slide C-40. Title: Sighting Along an Assigned Azimuth

"The navigator then looks through the sight slot (POINT) and then along the sight wire (POINT) to an easily recognizable object (POINT) in the distance."

7. Administration (1 min)

"This is the end of your instruction in the Use of the Compass. In the next period, you will receive practice in Sighting and Reading. After the break, you will proceed to the Compass Sighting Course which is a circle of 36 stakes. You will line up two men to a stake except for a few stakes that will require three men."

BREAK (10 min)

PERIOD ONE

SECTION II

SIGHTING AND READING

HOUR:	2 of 12
PURPOSE:	To give students instruction and practical drill in procedures of sighting and reading the compass
TRAINING AIDS:	1 Scorecard per student (see App II, Sec II), Sec IIA 1 Scorecard per student (see App II, Sec II), Sec IIB 1 Public address system (AN/TI Q 1A or equivalent), Sec IIA
PHYSICAL FACILITIES:	Field facility, "Compass Sighting Course" (see App III, Sec II) Sec IIA Field facility, "Sighting Range" (see App III, Sec II) Sec IIB
PERSONNEL:	1 Principal Instructor (PI) 8 Assistant Instructors (AI's), Sec IIA 1 Assistant Instructor (AI), Sec IIB

ORGANIZATION — Section IIA training occurs first. Upon meeting a Section IIA training criterion, students move to Section IIB training facility for supplementary training.

PERIOD ONE

SECTION IIA

COMPASS SIGHTING COURSE

ORGANIZATION: — Two students will be assigned to each stake, except for six stakes that require three students. The PI will be stationed at the PI stake near the Compass Sighting Course. Eight AI's are dispersed around the circle to aid as required.

TIME BREAKDOWN

Time in Minutes	Type of Instruction	Subject
5	—	Organization
5	C	Sighting and reading
40	PE	Sighting and reading
10	—	BREAK

(NOTE: During the 40 minutes of PE in Sighting and Reading, those students who have completed three successive sightings correctly, in sightings one through four on the "Compass Sighting Course," will move to the "Sighting Range" for supplementary training.)

LESSON OUTLINE

1. Organization (5 min)

(NOTE: Two students will be assigned to each stake, with the exception of six stakes. Starting with the stake at magnetic north every sixth stake will require three students. AI's will distribute scorecards to students at the stakes and be responsible

for aiding in the critiquing after each sighting. Each AI will be assigned four or five stakes as required.)

2. Sighting and Reading (5 min)

a. Administration

(1) "Print your name in the space provided on the top of your scorecard." (NOTE: Pause to allow for entering of names on scorecard.)

(2) "Look at the number on the stake you are assigned to and then look at the first number under the heading 'From number' on your scorecards."

(3) "These numbers should be the same. If they are not, raise your hand and one of the cadre will give you the correct scorecard."

(4) "One man will stand on each side of the stake."

(5) "If there are three men at the stake, one will do his sighting from a kneeling position in front of the stakes." (NOTE: Pause to allow for organization.)

b. Procedure

(1) "From your stake, do what the scorecard tells you, sight at so many degrees."

(2) "Your line of sight will pass near a stake somewhere on the other side of the circle."

(3) "You will see a number on this stake. Write that number in the space provided on your scorecard. When you are finished, step behind your stake outside the circle."

(4) "This sighting can be done quickly and accurately if you follow the instruction you received in the last hour."

(5) "Now make your first sighting."

c. Reversing the Panel

(NOTE: Pause until about 90% have finished.)

"One man at each stake will now reach up and lift his stake number panel off its nail, turn it around, and hang it up

again so that the men on the other side of the circle can see the lettered clue printed on the back."

d. Scoring

(1) "Each man now look for the panel that has his letter clue on it."

(2) "If the number behind the letter clue and your seen number are the same, mark yourself correct by placing a 'C' in the space to the right on your scorecard."

(3) "If you are wrong place an 'X' in this space, then take a quick sighting to the correct stake to determine why you were wrong."

(4) "If you have any difficulty raise your hand."

(NOTE: AI's will assist any student who has difficulty, in the AI's area of responsibility. The PI will pause to allow for individual critiquing by the AI's.)

e. Returning the Panel

(1) "One man at each stake will now return the panel to its original position." (PAUSE)

(2) "All men will now return to the stakes and be ready for the second sighting." (PAUSE)

(3) "Remember to practice speed in your sighting and reading."

(4) "Now take your second sighting."

(NOTE: Follow the same procedure for trials 2 and 3. When 90% of students have finished each sighting, order the panels turned.)

f. Collection of Scorecards

(NOTE: These instructions follow Trial 3.)

"If you have gotten all three sightings correct, give your scorecard to the AI near you and he will instruct you as to what to do next."

(NOTE: AI's will collect the scorecards of all successful students, and instruct them to fall in, in single file, in front

again so that the men on the other side of the circle can see the lettered clue printed on the back."

d. Scoring

(1) "Each man now look for the panel that has his letter clue on it."

(2) "If the number behind the letter clue and your seen number are the same, mark yourself correct by placing a 'C' in the space to the right on your scorecard."

(3) "If you are wrong place an 'X' in this space, then take a quick sighting to the correct stake to determine why you were wrong."

(4) "If you have any difficulty raise your hand."

(NOTE: AI's will assist any student who has difficulty, in the AI's area of responsibility. The PI will pause to allow for individual critiquing by the AI's.)

e. Returning the Panel

(1) "One man at each stake will now return the panel to its original position." (PAUSE)

(2) "All men will now return to the stakes and be ready for the second sighting." (PAUSE)

(3) "Remember to practice speed in your sighting and reading."

(4) "Now take your second sighting."

(NOTE: Follow the same procedure for trials 2 and 3. When 90% of students have finished each sighting, order the panels turned.)

f. Collection of Scorecards

(NOTE: These instructions follow Trial 3.)

"If you have gotten all three sightings correct, give your scorecard to the AI near you and he will instruct you as to what to do next."

(NOTE: AI's will collect the scorecards of all successful students, and instruct them to fall in, in single file, in front

of the panel marked "Sighting Range." FI will allow time for organization.)

g. Movement to Second Stake of Sighting Circle by Remaining Students

(1) "Your next sighting will be taken from a different stake."

(2) "Face left and march around the circle, counting nine stakes."

(3) (NOTE: Allow time for movement around the circle.) "Check your scorecard and see if the second number under the heading 'From number' matches the number on the stake."

(NOTE: After organization, follow the same procedure as the first three sightings.)

h. Collection of Scorecards (Second Group)

(NOTE: Continue after fourth sighting and critiquing)

"If you have gotten the last three sightings correct, give your scorecard to the AI near you and he will then instruct you as to what to do."

(NOTE: The AI will collect the correct scorecards for sightings 2, 3, and 4 and instruct these students to fall in at the "Sighting Range.")

i. Final Sightings

(NOTE: Continue after organization)

"You will now take two more sightings from the same stake."

(NOTE: Follow the same sighting procedure for the last two sightings. There will be no collecting of scorecards with three successive correct sightings after the fifth sighting.)

BREAK (10 min)

SECTION IIB

SIGHTING RANGE

PURPOSE: To give supplementary training to those students meeting the criterion performance in Section IIA

ORGANIZATION: Those students who have met the Section IIA criterion performance after the third trial will each be assigned to a stake on the "Sighting Range." One AI will supervise this supplementary training. Those additional students who have met the Section IIA criterion performance after the fourth trial will also be assigned to a stake on the "Sighting Range."

(NOTE: Each student will take three sightings from his assigned stake. If time permits students can take additional sightings from a new assigned stake if they so desire.)

LESSON OUTLINE

(NOTE: This supplementary training will be given to those students who complete three successive sightings on the sighting circle in sightings one through four.)

1. Organization

(NOTE: The AI in charge will assign one student to each of the fifteen stakes and distribute scorecards. Each extra student will be assigned a stake and given a scorecard and told to fall in behind the man at the stake, to wait until the first man has completed his sightings.)

2. Procedure for Supplementary Training

a. Administration

(1) "Print your name on the scorecard in the space provided." (NOTE: Pause to allow for entering of names.)

(2) "Check to see that the number on your scorecard under the heading 'From number' matches the number on your stake." (PAUSE)

b. Procedure

"You will take three sightings from your assigned stake. Sight to the lettered panel indicated on your scorecard and enter the degrees you read in the space provided on your scorecard."

c. Scoring Key

(1) "These stakes are divided into three groups: 1-5, 6-10, 11-15."

(2) "Behind each group there is a key panel showing the correct readings to each panel."

d. Scoring

(1) "When you have entered the 'degrees read' on your scorecard, turn around and check your answer."

(2) "If you are right, put a 'C' in the space to the right of your degree reading on your scorecard."

(3) "If you are wrong, mark an 'X' in this space and resight on the panel to check the reading."

(4) "Do this for all three sightings."

e. Collection of Scorecards

(1) "When you have finished all three sightings, step back to allow the next man to complete his sightings."

(2) "Give the scorecards to me."

(3) "If you wish to make more sightings, I will assign you to a new stake."

(NOTE: Assign student to a group different from the one from which he made his first sightings.)

f. Purpose

(1) "This course will provide you with additional practice in sighting and reading the compass."

(2) "Take all sightings as quickly as possible, following all the instructions received in the last hour."

g. Sightings

"Now begin the sightings."

(NOTE: The AI will repeat these instructions, assign stakes, and distribute scorecards to the next group of students from the sighting circle that have completed three successive correct sightings. After the students have completed their sightings, the AI will direct them to an assembly area to await the end of the period.)

PATROL I: LAND NAVIGATION

LESSON PLAN

PERIOD TWO

DEAD RECKONING

HOUR: 3-6 of 12

INSTRUCTION TIME: 240 minutes

PURPOSE: To provide instruction and practice in determining and maintaining distance and direction in the field

INSTRUCTOR REFERENCES: FM 21-26, Par 52, 126-129, 133, 136, 137, 141, 142

TRAINING AIDS: See Lesson Plan, Sec I, II, III, IV, V, and VI
1 Student roster

STUDENT UNIFORM AND EQUIPMENT: Uniform, DL
1 Compass, lensatic
1 Tent rope or GI shoestring
1 Pencil, black lead

PHYSICAL FACILITIES: Courses: (See App III, Sec II)
"Maintaining Direction While Moving" (Sec II)
"Determining the Individual Standard" (Sec III, Part II)
"Applying the Standard" (Sec IV)
"Detouring" (Sec V)
"Dead Reckoning" (Sec VI)

PERSONNEL: 1 Principal Instructor (PI)
1 Assistant Instructor (AI) per 40 students (Sec I)
1 AI per 9 students (Sec II)
1 AI per 14 students (Sec III)
1 AI per 14 students (Sec IV)
1 AI per 9 students (Sec V)
1 AI per 9 students (Sec VI)

SAFETY FACTORS: First Aid Kit with PI

ORGANIZATION: See Lesson Plan, Sec I, II, III, IV, V, and VI

TRANSPORTATION: As required

TIME BREAKDOWN

(Total Time: 240 minutes)

Time in Minutes	Type of Instruction	Subject
15	C, D	Section I. Use of steering marks: function, selection, and special problems.
20	C, D, PE	Section II. Maintaining direction while moving: instruction, drill.
10	—	BREAK (Utilize for movement to distance facility)
20	C, D	Section III, Part I. Distance determination: employment of standards, compensation, and special problems.
30	C, D, PE	Section III, Part II. Determining the individual standard.
10	—	BREAK (Utilize for movement to applying the standard facility)
35	C, D, PE	Section IV. Applying the standard: instruction, drill.
30	C, D, PE	Section V. Detouring: instruction, drill.
10	—	BREAK (Utilize for movement to dead reckoning facility)
50	C, D, PE	Section VI. Dead reckoning: instruction, drill.
10	—	BREAK

LESSON PLAN

PERIOD TWO

SECTION I

STEERING MARKS

PURPOSE: To instruct students in the proper use of the steering mark as a guide in direction and distance reckoning

TRAINING AIDS: 4 Charts: 1. S-1 Steering Marks (See App II, Sec II)
2. S-2 Possible Steering Marks (See App II, Sec II)
3. S-3 The Far Steering Mark (See App II, Sec II)
4. S-4 Selection of Steering Marks at Night (See App II, Sec II)

1 Mock-up of compass cover (See App II, Sec II)

PHYSICAL FACILITIES: Entire group seated for instruction

TIME BREAKDOWN

Time in Minutes	Type of Instruction	Subject
1	C, D	Definition and function
8	C, D	Selection
2	C, D	Steering marks at night
4	C, D	Special problems

LESSON OUTLINE

SECTION I

STEERING MARKS

1. Definition and Function (1 min)

a. "'A Steering Mark', as defined by the Army (FM 21-26), 'is any well-defined object on the ground in the direction of

travel toward which the navigator may steer'."

b. "A steering mark can be a tree, a rock, etc."

c. "A steering mark provides a specific point rather than a general area on the ground toward which to move."

d. "A steering mark permits movement on an assigned azimuth with less frequent reference to the compass."

2. Selection (8 min)

(NOTE: Chart 1 is now shown.)

"The best steering mark is the most distinct (POINT), far (POINT), and high (POINT) point lying within the distance to be traveled on a single azimuth (POINT)."

(NOTE: Chart 2 is now shown.)

(1) "The distinct mark is easily recognized."

(NOTE: Place mock-up over the pine in front of the bare tree. Point out that the bare tree is the steering mark to use since it is much more distinct than the pine, if the navigator is travelling on an azimuth that puts both these marks along the sight wire.)

(2) "The high mark is more easily kept in view."

(NOTE: Place mock-up over high bare tree, high leafy tree, tall broken tree.)

"If a high mark is chosen along an azimuth it is not easily lost as is a low mark that blends into the background as the navigator approaches it."

(NOTE: Place mock-up over lone little pine in clearing and then over boulder.)

(3) "Low steering marks can be used in cases where they are on an assigned azimuth where no other steering marks appear."

(4) "The mark which can be physically reached is superior to the mark which is impractical or impossible to reach."

(NOTE: Place mock-up over tall pine on line with water tower.)

"The water tower on the horizon does not seem to be within normal distance of travel on an azimuth, so the tall pine should be chosen as a steering mark if traveling on an azimuth where both were along the sight wire. The tall pine can be reached and offers more accuracy."

(5) "The far mark requires fewer sightings than a succession of near marks."

(NOTE: Chart 3 is now shown.)

"This navigator is making one sighting along his assigned azimuth instead of four separate sightings to near marks."

(NOTE: Good steering marks in the background terrain should be pointed out if time permits, but it should be made clear that the navigator does not have a lateral choice of steering marks. He must choose only from those along the sight wire when sighting along an assigned azimuth.)

3. Steering Marks at Night (2 min)

a. "At night because of visibility only high marks which can be seen clearly against the skyline (POINT) should be used."

b. "It is also possible to use distinct near steering marks to maintain direction at night."

4. Special Problems (4 min)

a. "When no steering marks are available, it is possible to maintain direction by frequent reference to the compass."

b. "When a steering mark is lost, a new mark should be selected immediately."

c. "After the navigator has selected a steering mark in an area in which the available steering marks all look alike, such as in the middle of woods, he should open both eyes while sighting to see the mark in relation to its surroundings. He should also be careful to choose a distinct mark."

d. "When there are no steering marks on the line of sight, one which is off-course may be selected and used as a guide."

(NOTE: Show Chart 2 again, placing the mock-up sight wire just to one side of a steering mark to illustrate the point.)

LESSON PLAN

PERIOD TWO

SECTION II

MAINTAINING DIRECTION WHILE MOVING

PURPOSE: To provide students practice in holding, reading, and sighting the compass, and in the use of steering marks while moving along an assigned azimuth

TRAINING AIDS: 1 Scorecard per student (See App II, Sec II)
1 Student roster

PHYSICAL FACILITIES: Field Course: Maintaining Direction while Moving (See App III, Sec II)

ORGANIZATION: Entire group undergoes course simultaneously.

TIME BREAKDOWN

Time in Minutes	Type of Instruction	Subject
5	C, D	Instruction in procedure
15	PE	Drill in maintaining direction while moving

LESSON OUTLINE

SECTION II

MAINTAINING DIRECTION WHILE MOVING (20 min)

(NOTE: Two trainees will be assigned to each stake with the exception of six stakes. Starting with the stake at magnetic north, every sixth stake will require three men. Scorecards will be distributed to each stake.)

1. Instructions in Procedure (5 min)

a. "You have just been instructed on how to use steering marks in maintaining direction. In this course you will be

given a direction mission that requires you to move from your stake to a point about 80 meters away."

b. "Print your name on the scorecard in the space provided."

(NOTE: Pause to allow time for entering of names.)

"Check your scorecard to see that the number of the stake you are assigned to and the number under the heading 'From number' are the same."

c. "When you are told to, move out at the degrees indicated on your scorecard. Select and use the best steering marks to maintain your assigned degree heading until you come upon a strip of white engineer tape on the ground."

d. "Write down the number of the nearest panel in the space provided on your scorecard. Then look on the back of the panel to see if the letter on the back of the panel matches the letter clue on your scorecard. If you are correct, put a 'C' in the space provided on your scorecard. If you are wrong, put an 'X' in this space, then find the panel with your letter clue. From your correct panel move out at the degrees indicated. This degree heading will bring you back to your starting stake."

e. "Now move out at the degrees indicated on your scorecards."

2. Drill in Maintaining Direction While Moving (15 min)

(NOTE: After organization in the inner circle the AI will move out to the edge of the outer circle. Each AI will be assigned four or five stakes. The AI will assist any trainee that is having difficulty locating his correct stake and also spot check the scorecards.) (BREAK 10 min)

LESSON PLAN

PERIOD TWO

SECTION III

DISTANCE DETERMINATION

PURPOSE: To provide students instruction in the principles of dead reckoning and practice in determining their individual pace for 100 meters of varying terrain

TRAINING AIDS: 5 Charts: 1. D-1 Conditions which Shorten Normal Pace (See App II, Sec II)
2. D-2 The Detour (See App II, Sec II)
3. D-3 Using a Steering Mark Count Forward Steps Only (See App II, Sec II)
4. D-4 Absence of Steering Marks (See App II, Sec II)
5. D-5 Sidestepping a Visual Obstruction (See App II, Sec II)

1 Scorecard per student (See App II, Sec II) (Wallet size to be retained by student)
1 Scoring Key, "Conversion Table," per AI (See App II, Sec II)

PHYSICAL FACILITIES: Three Courses: "Determining the Individual Standard" (See App III, Sec II)
Suitable area for outdoor instruction
1 Easel with pointer

ORGANIZATION: Entire group receives instruction simultaneously and files onto 100 meter lanes.

TIME BREAKDOWN

Time in Minutes	Type of Instruction	Subject
1	C, D	Introduction
3	C, D	Individual standard of measurement
3	C, D	Applying the standard
3	C, D	Compensation
3	C, D	Specific problems in distance
5	C, D	Detouring
1	C, D	Summary

Time in Minutes	Type of Instruction	Subject
5	C, D	Instructions in determining the individual standard
30	PE	Drill: determining the individual standard

LESSON OUTLINE

SECTION III, PART I

DISTANCE DETERMINATION

1. Introduction (1 min)

"Previously, we have been concerned mainly with the DIRECTION aspect of dead reckoning: holding and reading the compass, sighting, maintaining direction, steering marks, and so on. Now we are going into the second essential phase of the dead reckoning process, that of distance."

2. The Individual Standard of Measurement (3 min)

a. "Before being able to accurately reckon distance, it is necessary first to determine the number of paces it takes to walk 100 meters."

b. "This will be determined later on 100 meter courses."

c. "The count will be applied by stepping off with the left foot and counting each time a foot strikes the ground."

d. "Upon completing the courses, the result will be an individual pace-count for various types of terrain, to be applied in measuring terrain."

e. "The first course traversed will be 100 meters of flat, cleared ground, marked by panels at 25 meter intervals."

f. "Two trips will be made on this course. The first will be merely to determine the number of paces each individual takes to travel 100 meters."

g. "At the end of the 100 meter course, an AI will obtain each individual's number of paces and will, by means of a table, convert it to a 'correction value', in other words, the number

of extra paces over 25 each individual will take in walking each 25 meter piece of ground. Each man will be issued a small, wallet-sized card on which to write down his number of extra paces."

3. Applying the Standard (3 min)

a. "On the return trip, this number of extra paces will be applied."

b. "Each man will count each time a foot strikes the ground until he reaches a count of 25."

c. "Since this will land him short of the first panel, he will now add in his extra paces, the number given him by the AI."

d. "This number of extra paces should bring him up to the first panel."

e. "He will then start for the second panel, picking up the count where he left off, that is, starting off at 26, 27, 28, and so on."

f. "He will count now up to 50 and again apply the extra paces to bring him to the second panel."

g. "At the end of 100 meters, his count will be 100."

h. "This number of extra paces for each 25 meters of ground can be added to each 25 paces an individual travels over flat cleared ground, enabling him to accurately measure distance."

4. Compensation (3 min)

a. "This number of extra paces each man comes up with will be his own individual pace count, to be remembered and applied each time he measures distance over flat, cleared ground."

b. "Suppose now that the mission was to travel 100 meters over ground that was not flat and cleared but full of hills, ditches, streams, and heavy underbrush."

c. "In such terrain it is difficult to maintain the regular walk, and the normal pace will be shortened."

d. "Here is a list of conditions which shorten the normal pace."

(NOTE: Show Chart D-1. Title: Conditions which Shorten Normal Pace. Read aloud to trainees. When charts are not in use, canvas cover will be dropped over them.)

e. "When these conditions interfere and shorten the normal pace, the individual's number of extra paces per 25 meters of flat cleared ground will land him once again short of the mark."

f. "To correct this, he must next determine how many extra paces he will take in traversing 100 meters of rough ground."

g. "A second course over rough ground will be traveled to enable each man to determine his correction value or extra paces for that type terrain."

h. "A third course over very rough terrain makes it possible to determine a third number of extra paces to apply on that type ground."

i. "The main idea behind this process is to present each man with an example of each of these various types of ground and enable him to determine the number of extra paces he will take for each 25 meter distance to bring him to the correct mark."

j. "To summarize, each man will determine the number of extra paces (beyond his count of 25) which are needed to bring him out correctly to the 25 meter mark."

k. "He will obtain three such numbers to be remembered and applied in travelling over easy ground, rough ground, and very rough ground."

l. "He will apply these extra steps four times in measuring 100 meters, and his count will never go beyond 100."

5. Specific Problems in Distance (3 min)

a. "One of the major problems in distance reckoning is that of remembering the distance count."

b. "The navigator will have other things on his mind, such as maintaining direction, detouring, and so on."

c. "Here are three hints which will aid in remembering the count."

(1) "Tie a knot in the 'memory rope' each time you complete 100 meters. Doing this, it will not be necessary to keep mental track of distances over 100 meters."

(2) "When stopping to sidestep, sight, detour, or through heavy brush, any time there is a break in the count, make a mental note of the count. Saying the count out loud when stopped will further impress it upon the mind."

(3) "If travelling with a buddy, always compare pace counts at stops."

6. Detouring (5 min)

a. "While on a distance mission, an individual will find many cases where it will be impossible to maintain a straight-line course."

b. "There will be many obstacles such as ponds, swamps, and heavy briar patches which will make it impossible to continue on an azimuth."

c. "To overcome an obstacle, it will be necessary to detour it and get back on the original course."

d. "The first problem in detouring is an obstacle to movement, such as a pond."

(NOTE: Show Chart D-2. Title: The Detour.)

(1) "In this case it is possible to see across the pond, so the navigator has selected a steering mark on his azimuth on the far side of the pond."

(2) "He moves laterally by 90 degrees along this arrow (POINT) until the pond has been cleared, resumes the original azimuth until the pond is cleared forward (POINT) and returns to the original course by another 90 degree turn. His detour describes a box-shaped route."

(3) "On this same detouring problem, in order for the navigator to maintain his distance count, he will count his forward steps only."

e. (NOTE: Show Chart D-3. Title: Using a Steering Mark, Count Forward Steps Only.)

"Here (POINT) he drops the count while moving sideways, and continues it while moving in a forward direction."

f. "Another type obstacle is one through which it is impossible to see."

(NOTE: Show Chart D-4. Title: Absence of Steering Marks.)

(1) "In this case it is this heavy growth of briars." (POINT)

(2) "Since it is impossible to select a steering mark on the far side, it is necessary to make a seperate count of sidesteps."

(3) "Once the obstacle is cleared forward, the same number of sidesteps will return the navigator to his original course."

(4) "It must be kept in mind that the forward count is maintained, and the sidesteps are counted separately."

(5) "This method is useful when no steering marks are available, or at night when visibility is poor."

g. (NOTE: Show Chart D-5. Title: Sidestepping a Visual Obstruction.)

(1) "To detour a minor obstacle which blocks your line of sight to a steering mark, sidestep until a steering mark is available on the azimuth." (POINT)

(2) "Upon reaching the steering mark (POINT) sidestep back to the original course."

(NOTE: See Annex 1.)

7. Summary of Detouring (1 min)

a. "By way of summary, keep in mind that the forward count is always maintained."

b. "Only in the case where a steering mark cannot be used is it necessary to count sidesteps."

c. "Now we will move out to the three 100 meter courses to determine the individual number of extra paces for each trainee."

ANNEX I

PERIOD TWO

SECTION III, PART I

DEAD RECKONING ORAL TEST (OPTIONAL)

1. Instructor's Note

The questions listed below are not part of the 12-hour instruction in PATROL I Land Navigation. They may be used by the instructor prior to the summary, in the event he finds himself with extra time at the end of the class. Trainees selected at random from a student roster, should be called upon to answer the questions orally.

2. Questions

a. Briefly explain how you will arrive at your "number of extra paces" for reckoning distance.

b. How would you detour a house?

c. How would you detour a pond you could see across?

d. Name some conditions which shorten the normal pace.

e. What are some methods to help you remember the distance count?

f. What should each man's count be at the end of 100 meters?

g. When is it necessary to count sidesteps separately?

h. What would you do if you couldn't select a steering mark because a big bush was in your way?

LESSON OUTLINE

SECTION III, PART II

DETERMINING THE INDIVIDUAL STANDARD

1. Field Course: "Determining the Individual Standard, Easy Ground, Moderate Ground, and Rough Ground" (5 min)

a. "On this course, each man will first walk off the 100 meters, counting each time a foot strikes the ground."

b. "Ignore the panels on the first trip, and tell the AI at the end of the course your number of paces."

c. "He will then give you your number of extra paces for each 25 meter interval. Write this number down on your wallet size score-card in the box labeled 'Easy Ground'."

d. "On the return trip, you will count off your paces up to 25, and then take as many extra paces as your card now indicates. This should bring you to the first panel."

e. "Start off for the next panel, picking up the count at 26, 27, 28, and so on, and again take the extra paces to bring you to the second panel."

f. "Follow this process until you complete the course, at which time your count should be 100."

g. "Make sure to use your normal walk, and don't be self-conscious."

h. "When you finish, go to the next course marked 'Moderate Ground', and follow exactly the same procedure. The number of extra paces will be different, so remember to write it on your scorecard."

i. "Upon completion of the second course, begin immediately on the third course marked 'Rough Ground' and do the same."

j. "Remember, you only have approximately 10 minutes for each course, so do not waste time."

k. "Line up here and begin the course."

2. Drill in Determining the Individual Standard (25 min)

BREAK (10 min)

LESSON PLAN

PERIOD TWO

SECTION IV

APPLYING THE STANDARD

PURPOSE: To provide students practice in reckoning distance over varying types of terrain.

TRAINING AIDS:
1 Scorecard per student (See App II, Sec II)
1 Student roster
1 Scoring Key "Applying the Standard" per AI (See App II, Sec II)

PHYSICAL FACILITIES: Field Course: "Applying the Standard" (See App III, Sec II)

ORGANIZATION: Students will be equally distributed over four starting points as they complete the course, "Determining the Individual Standard."

TIME BREAKDOWN

Time in Minutes	Type of Instruction	Subject
5	C, D	Instruction in procedure
30	PE	Drill in applying the standard

LESSON OUTLINE

SECTION IV

APPLYING THE STANDARD (35 min)

(NOTE: AIs will assemble groups of eight men as they complete the previous course, and render the following briefing.)

1. Instruction in Procedure (5 min)

a. "On this course you will be tested on how well you are able to reckon distance by applying your number of extra paces."

b. "This course is laid out on varying terrain, so in walking it, you will see examples of all the three different types of ground you traversed in the first course."

c. "You will have to judge which number of extra paces to take for each 25 meter distance by determining which type of ground you are on, easy, moderate, or rough."

d. "Each man will start off from one of several starting points and count paces and add extra paces until he thinks he has traveled 100 meters."

e. "When he stops, he will write down the nearest stake number on his scorecard in the box marked '100 meters'."

f. "An AI will tell him if he is short, long, or correct and then start him off on the second 100 meters.

g. "When he thinks he has traveled another 100 meters he will again write down on his scorecard the nearest stake number, this time in the box marked '200 meters'."

h. "After being corrected again, he will travel the third 100 meters and follow the same procedure."

i. "Remember to judge what type of ground you are traversing, easy, moderate, or rough, and use the appropriate number of extra paces for each 25 meter distance."

j. "Your count at the end of each 100 meters should be 100."

k. "Line up here and begin the course."

2. Drill in Applying the Standard (30 min)

LESSON PLAN

PERIOD TWO

SECTION V

DETOURING

PURPOSE: To provide students practice in the detouring process while maintaining direction and distance.

TRAINING AIDS:	1 Scorecard per student (See App II, Sec II) 1 Student roster 1 Scoring Key, "Detouring," per AI (See App II, Sec II)
PHYSICAL FACILITIES:	Field Course: "Detouring" (See App III, Sec II)
ORGANIZATION:	Entire group commences simultaneously, with 7 students starting out from each of 12 starting points.

TIME BREAKDOWN

Time in Minutes	Type of Instruction	Subject
5	C, D	Instruction in procedure
25	PE	Drill in detouring

LESSON OUTLINE

SECTION V

DETOURING (30 min)

1. Instruction in Procedure (5 min)

a. "Turn to page 2 of your scorecard. This course is designed to give you practice in what you have learned in the classroom on detouring."

b. "There are five circles of stakes out there beyond the canvas. Each man is meant to navigate out there, maintaining direction by using his compass, and distance by using the pace-count."

c. "In the process, he will have to detour the canvas screens, remembering to maintain his distance count and count his sidesteps separately since he cannot select a steering mark on the opposite side of the screen."

d. "When you arrive at the stake which you think is correct, write down the number of that stake in the appropriate box on your scorecard. An AI will then take your scorecard and tell you whether you landed correctly or long, short, right, or left."

e. "Now, look at your scorecards where you will see your start stake number. This will be the stake from which you will begin your mission."

f. "Notice each man has a mission, written in degrees and meters. He will sight along the assigned azimuth at the start stake, and move out counting his paces."

g. "Report to your start stake and begin the course."

2. Drill in Detouring (25 min) (BREAK 10 min)

LESSON PLAN

PERIOD TWO

SECTION VI

DEAD RECKONING

PURPOSE: To provide students practice in the dead reckoning process: sighting the compass, maintaining direction and distance while moving.

TRAINING AIDS:
1 Scorecard per student (See App II, Sec II)
1 Student roster
1 Scoring Key per AI (See App II, Sec II)

PHYSICAL FACILITIES: Field Course: "Dead Reckoning" (See App III, Sec II)

ORGANIZATION: Entire group commences simultaneously, half the group from the North Start, half from the South Start.

TIME BREAKDOWN

Time in Minutes	Type of Instruction	Subject
5	C, D	Instruction in procedure
45	PE	Drill, dead reckoning

LESSON OUTLINE

SECTION VI

DEAD RECKONING (50 min)

1. Instruction in Procedure (5 min)

a. "Turn to page 3 in your scorecard. This is a course to test your ability to dead reckon: To travel from one point to another by use of the compass and by counting paces."

b. "There will be no problem of detouring on this course, other than a few trees which may block your path."

c. "On your scorecard you will find the number of the stake you are to start from, and your mission once again in degrees and meters."

d. "Half of the group (last name initials A thru ____) will begin from one end of the course, and the other half (last name initials ____ thru Z) will begin from the other."

e. "When you reach the stake to which your mission brings you, write down its number in the appropriate box in your scorecard, and bring it to one of the AIs who will tell you if you are correct."

f. "Remember what you have learned about the proper use of the compass and the method of reckoning distance."

g. "Most people tend to drift to the right while travelling on an azimuth. Bear this in mind. Those of you who drifted right on the steering mark course should take special care to avoid this."

h. "Many people also tend to end up short of their objective for several reasons. One reason is because they failed to apply their correct number of extra paces. Another reason is that people cannot travel a perfectly straight line although the distance mission calls for it. For example, you walk over ground which goes up and down, and go around trees and underbrush constantly. Any time there is doubt in your mind as to your objective, choose the further one."

i. "Report to your start stake and when the signal is given, move out."

2. Drill in Dead Reckoning (45 min) (BREAK 10 min)

PATROL I: LAND NAVIGATION

LESSON PLAN

PERIOD THREE

MAP USING

HOUR:	7 and 8 of 12
INSTRUCTION TIME:	120 minutes
PURPOSE:	To provide elementary instruction in map symbol recognition, recognition of terrain, map distance measurement, checkpoint types, and map orientation
INSTRUCTOR REFERENCES:	FM 21-26, Chap 2
TRAINING AIDS:	1 Overhead projector (FH 637, "Master Vu-Graph"), 1000 watt 39 Film Slides, Period Three, Map Using 1 Student roster
STUDENT UNIFORM AND EQUIPMENT:	Uniform DL 1 Answer Sheet (See App II, Sec III) 1 Map (Ft Benning, Ga., 1:25,000, Sheet Fr 4048 IV SE) 1 Pencil
PHYSICAL FACILITIES:	Classroom equipped as follows: 1 Instructor's lectern with lamp 1 Instructor's pointer (5-6 ft) 1 Chair and desk (or table) per student Blackout curtains or opaque shades Slide projection screen
PERSONNEL:	1 Principal Instructor (PI) 1 Assistant Instructor (AI) per 40 students 1 Projector operator
ORGANIZATION:	Students seated at desk or tables at beginning of class. Answer sheets on desk before students. AIs dispersed about classroom to aid as required.

THE BREAKDOWN

Time in Minutes	Type of Instruction	Subject
2	C	Introduction and purpose
15	C, D	Map symbolism
5	PE	Contour interpretation
15	PE	Map symbols and contour interpretation
3	C, D	Measurement of map distance
3	PE	Measurement of map distance
7	C, D	Review of map symbolism and map distance measurement
10	—	BREAK
10	C, D	Checkpoint recognition
10	PE	Checkpoint recognition
5	C, D	Clarity of checkpoints
10	C, D	Map orientation
5	PE	Map orientation
7	C, D	Review of checkpoint recognition and map orientation
3	—	Scoring
10	—	BREAK

LESSON OUTLINE

1. Introduction and Purpose (2 min) (LIGHTS OUT)

(NOTE: Show Period Three identifying slide for 15 seconds.)

(NOTE: Show Slide M-1. Title: The Checkpoint in Early Training and Later Training)

(1) "Up to now, numbered panels have been used as checkpoints to show how close you have come to your objective or how well you have stayed on route."

(2) "In future training, checkpoints (i.e., recognizable terrain features) such as a hilltop, valley, stream, etc. must give you the same information."

(3) "In this period, we will discuss how you determine, from a map, what checkpoints lie along your route and which checkpoints are the best."

(4) "A checkpoint is found in advance on a map, then later recognized on the ground. A steering mark is not found in advance on a map but is found on the ground in the desired direction."

2. Map Symbolism (15 min) (CONTINUED LIGHTS OUT)

a. (NOTE: Show Slide M-2. Title: The Map)

(1) "A map is a pictured representation, on a flat surface, of both natural and man-made features of a given area of land as seen from above."

(2) "To use a map, you must know what the lines and colors represent."

b. (NOTE: Show Slide M-3. Title: Terrain Features vs Map Symbols)

(1) "On the left is a map of the piece of terrain pictured on the right."

(2) "Woods are shown as green sections on the map." (POINT AND COMPARE.)

(3) "All man-made features are drawn in black, except highways, if any, which are red. (POINT) Trails are shown as a single broken line (POINT), unimproved roads are double broken lines (POINT), and hard-surface roads are solid black lines (POINT). Buildings are black squares (POINT)."

(4) "All water features are drawn in blue (e. g., streams and ponds). Swamps are also blue with short lines drawn throughout the area. (POINT) Streams are solid blue lines and intermittent streams are shown by dotted-dash blue lines. Intermittent streams contain water only during wet weather."

(5) "White indicates a clearing without woods, but some trees and underbrush may be present."

(6) "The thin brown lines running all through the map are called contour lines. These show elevation, the way the land rises and falls, the hills and valleys, and how sharply or gently they slope. They are necessary since the map has only 2 dimensions, length and width."

c. (NOTE: Show Slide M-4. Title: Contour Indicates Slope)

(1) "Each line is ten feet above or below the adjacent lines (POINT) for the maps we deal with. This ten feet is known as the contour interval and may very on other maps. The contour interval used is indicated in the bottom margin of the map."

(2) "If the contour lines appear close together in the overhead or map view, the ground slopes steeply." (NOTE: Point to overhead view.)

(3) "If the contour lines are wide apart, the ground will slope gradually." (NOTE; Point to overhead view.)

d. (NOTE: Show Slide M-5. Title: Hill Contours)

(1) "On the right is a sketch of an actual hill with contour lines super-imposed and on the left is a view of this hill's contours from directly overhead, as it would appear on a map."

(2) "The top of a hill can be identified by a closed, often circular contour line. There are no other lines or marking inside. Other lines circle around each other to show the ground sloping downward."

e. (NOTE: Show Slide M-6. Title: Valley Contours)

(1) "A valley appears as a series of V's with a stream often running along the points of the V's. This is called a wet valley. A dry valley has no stream, but the contour lines appear in the same pattern."

(2) "In both the dry valley and the wet valley, the open ends of the V's will extend toward a main stream, letting water pour downhill."

(3) "Low ground may be identified by (a) blue lines indicating a stream (b) a pattern of V's in which the open ends of the V's face a main stream, allowing water to flow downhill, and (c) by the symbol for a depression."

f. (NOTE: Show Slide M-7. Title: Ridge Contours)

"A ridge or high ground is shown by U-shaped contours, the open end of the U extending toward high ground. High ground may be confirmed by the presence of hilltops. High ground is also likely in the area between two valleys."

g. (NOTE: Show Slide M-8. Title: Contours of a Depression)

"A localized low spot (depression) is shown as a closed circle contour line similar to a hilltop; however, there are small tick marks all along the inside of the closed contour line to differentiate between a low and high piece of terrain."

h. (NOTE: Show Slide M-9. Title: Contour Interpretation)

(1) "On the top of the slide is a section of a map with a route drawn across it. On the bottom is a profile view of the actual terrain the map represents."

(2) "Although the route on the map at first appears to be a straight line route over level ground, contours show that the ground slopes up to a hilltop, down into a valley, and up again over another hilltop."

3. Contour Interpretation. Drill. (5 min) (LIGHTS ON)

a. Sketch on Answer Sheet. Title: Terrain Model Without Contours

(1) "On the answer sheet, there is a drawing of a section of terrain. Draw in lightly the contour lines as they were drawn on the sketches you just saw."

(2) "Remember, the open ends of the V's of the valleys point toward the lower ground. The open ends of the ridge contours point uphill."

(NOTE: Allow one minute for drawing.)

b. (NOTE: Show Slide M-10. Title: Terrain Model With Contours. Lights off in the vicinity of the screen only.)

(1) "Compare your drawing with the slide. Check to see that the open ends of the U's (the lines on the ridges on the left and right), open uphill. Check to see that the valley lines in the center consist of V's with open ends pouring water downhill. Check

to see that the depression contours have tick marks."

(2) "If you have not drawn the lines in properly, do so now with heavy lines."

(NOTE: AI's will circulate to aid slow trainees.)

4. Map Symbols and Contour Interpretation. Drill. (15 min) (ALL LIGHTS OFF)

a. (NOTE: Show Slide M-11. Drill)

(1) "For Slide M-11 on the answer sheet, circle the letter of the correct answer that identifies the ground form at Point One. For example, if Point One (POINT) were a ridge, since (b) is 'ridge', you would circle (b) beside Point One of Slide M-11 on the answer sheet."

(2) "Which one of the following ground forms is found at Point One?"

(a) "Alternatives:"

(a) "hilltop" (c) "dry valley"

(b) "ridge" (d) "wet valley"

(NOTE: Have students raise their hands when they have marked the sheets. After approximately 80% of the class have signified by raised hands that they have answered the question, call on a student by name, from the roster, to give the answer.)

(b) Answer: (a) hilltop.

(c) "This is a hilltop, because the contour line is closed and there are no other contour lines inside it. No tick marks are present."

(d) "If your answer is wrong, place an X through it and check off the correct answer. There will be no erasures."

(3) "Which one of the following forms are found at Point Two?"

(NOTE: Repeat alternatives; follow same answering procedure as in Point One.)

(a) Answer: (c) dry valley.

(b) "This is a dry valley since the open ends of the V's extend toward a main stream and there is no blue line included."

(c) "If your answer is wrong, place an X through it and check off the correct one."

(4) "Which one of the following ground forms is found at Point Three?"

(NOTE: Repeat alternatives; follow same answering and scoring procedure as above.)

(a) Answer: (c) ridge

(b) "Point Three is a ridge since the open ends of the U extend toward high ground, that is, toward a hilltop."

b. (NOTE: Show Slide K-12. Drill)

(NOTE: Follow same answering, critiquing, scoring procedure for all remaining slides.)

(1) "Which of the following terrain features is found at Point One?"

(a) "Alternatives:"

(a) "ridge" (c) "depression"

(b) "dry valley" (d) "stream"

(b) Answer: (c) depression.

(2) "Which of the following terrain features is found at Point Two?"

Answer: (d) stream

(3) "Which of the following terrain features is found at Point Three?"

Answer: (b) dry valley.

c. (NOTE: Show Slide M-13. Drill)

(1) "Which of the following terrain features is found at Point One?"

(a) "Alternatives:"

(a) "ridge" (c) "dry valley"

(b) "hilltop" (d) "wet valley"

(b) Answer: (b) hilltop.

(2) "Which of the following terrain features is found at Point Two?"

Answer: (a) ridge.

(3) "Which of the following terrain features is found at Point Three?"

Answer: (d) wet valley.

d. (NOTE: Show Slide M-14. Drill)

(1) "Which of the following terrain features is found at Point One?"

(a) "Alternatives:"

(a) "woods" (c) "river"

(b) "swamp" (d) "pond"

(b) Answer: (d) pond.

(2) "Which of the following terrain features is found at Point Two?"

Answer: (b) swamp.

(3) "Which of the following terrain features is found at Point Three?"

Answer: (a) woods.

e. (NOTE: Show Slide M-15. Drill)

(1) "Which of the following terrain features is found at Point One?"

(a) "Alternatives:"

(a) "house" (c) "improved road"

(b) "unimproved road" (d) "trail"

(b) Answer: (d) trail.

(2) "Which of the following terrain features is found at Point Two?"

Answer: (c) unimproved road.

(3) "Which of the following terrain features is found at Point Three?"

Answer: (a) house.

f. (NOTE: Show Slide M-16. Drill)

(1) "Which of the following terrain features is found at Point One?"

(a) "Alternatives:"

(a) "ridge" (c) "woodline"

(b) "dry valley" (d) "none of these"

(b) Answer: (c) woodline.

(2) "Which of the following terrain features is found at Point Two?"

Answer: (a) ridge.

(3) "Which of the following terrain features is found at Point Three?"

Answer: (b) dry valley.

5. Measurement of Map Distance (3 min)

a. (NOTE: Show Slide M-17. Title: Copy the Meter Rule)

(1) "On the bottom of the map, there are three distance scales for measurement of distance in yards, meters, and miles. We will be interested only in the meter scale."

(2) "Your supervisor will usually measure all distances between checkpoints for you. However, you should know how to measure the distance between checkpoints and other terrain features located on or near the route."

(3) "First, we will make our own homemade ruler. To make this ruler, line up any straight-edged piece of paper with the scale marked 'meters' and draw lines at the ends of each division." (POINT)

(4) "Mark each hundred meters as you make the ruler."

b. (NOTE: Show Slide M-18. Title: Measuring Distance)

(1) "To measure the distance between two points, place the 0 line of the ruler on one point and the edge of the ruler on the other."

(2) "Read off the distance directly in meters."

(3) "If the distance does not fall exactly on one of the 100 meter lines, estimate the additional distance to the nearest 25 meters and add to the total."

(4) "For instance, in this slide, measuring from point B to point C, the distance is more than 600 but under 700 meters. C is almost 3/4 of the distance between 600 and 700 which would be 75 meters. So, the distance from B to C is approximately 675 meters."

6. Measurement of Map Distance (3 min)

a. (NOTE: Show Slide M-19. Drill)

(1) "Circle the letter on your answer sheet corresponding to the letter of the correct answer: If the ruler reads 550m and letter (b) is next to 550m, circle letter (b) on your answer sheet."

(2) "What is distance X-A in meters?"

(a) "Alternatives:"

(a) "500m" (b) "400m" (c) "350m" (d) "425m"

(NOTE: When approximately 80% of the class have signified by raising their hands that they have answered, ask for the answer by calling a student by name. Once the correct answer is given, critique it and go on to the next slide.)

(b) Answer: (b) 400m.

(c) "If your answer is wrong, place an X through it and check off the correct answer."

b. (NOTE: Show Slide M-20. Drill)

"What is the distance from A - B in meters?"

(NOTE: Use same answering and scoring procedure as above)

(a) "Alternatives:"

(a) "500m" (b) "525m" (c) "550m" (d) "575m"

(b) Answer: (c) 550m.

c. (NOTE: Show Slide M-21. Drill)

"What is the distance from B - C in meters?"

(a) "Alternatives:"

(a) "675m" (b) "625m" (c) "650m" (d) "700m"

(b) Answer: (a) 675m.

7. Review of Map Symbolism and Map Distance Measurement (7 min)

a. (NOTE: Show Slide M-22. Title: Map Symbols /Review/)

(1) "A dashed black line is a trail; double dashed black line is an unimproved road; solid black line is a hard-surfaced road; primary improved roads (highways) are red; black squares are buildings."

(2) "Wooded areas are green."

(3) "Clear areas are white."

(4) "Water is in blue. Intermittent (wet weather) streams are dotted-dash blue lines. Marshes or swamps are small blue lines."

(5) "Contour lines are brown."

b. (NOTE: Show Slide M-23. Title: Terrain Model With Contours [Review])

(1) "A hilltop is a closed, circular, contour line with no others inside."

(2) "A depression is a contour line with no other contours inside it, and with tick marks all along the inside of the contour line."

(3) "A Valley's contours, V's, open out toward low ground, pouring water into a main stream. A stream often runs in the valley."

(4) "The open ends of a ridge's contours, U's, point toward the high ground."

(5) "The closer together contour lines are, the steeper the slope; the further apart they are, the more gradual the slope of the land."

c. (NOTE: Show Slide M-24. Title: Copy the Meter Rule [Review])

"To measure distance between two points on a map, make a ruler by copying the meter scale and measure by placing ruler along the points."

BREAK (10 min)

8. Checkpoint Recognition (10 min)

a. Introduction

(1) "When you are traversing a route, you must use prominent topographic features to locate yourself on the map."

(2) "If you arrive at a crossroad and locate this feature on your map, you can easily see where you are in relation to your objective and other features."

(3) "In this way you can correct any mistakes you may have made in direction and distance by noting where you are in relation to where you should be."

b. (NOTE: Show Slide M-25. Title: Correction Value of Checkpoints)

(1) "When traversing a route, the prominent terrain features that enable you to locate your position on a map and correct your position are called checkpoints."

(2) "There are six types of checkpoints. (NOTE: Point to each word and figure shown on the slide in the following order.) Examples of each are: The spot (hilltop), two lines (crossroad), line and spot (ridgeline and hilltop), one line parallel to the route traveled (stream), one line perpendicular to the route traveled (valley), and (not shown) the beginning or end of a line (end of trail, valley, ridge)."

(3) "Each of these types except the straight line will give full correction in both distance and direction since they enable you to pinpoint your exact position on the map and on the ground."

(4) "The straight line parallel to your route gives you information about direction only. The line checkpoint lying across the route gives you information only about the distance you have traveled, since you cannot pinpoint your exact position."

c. (NOTE: Show Slide M-26. Title: A Checkpoint Can Aid Navigation)

(1) "Here is a prescribed route (POINT) which passes through a 2-line checkpoint (roadline and woodline) and a hilltop checkpoint."

(2) "If you deviate from your true route and come to a road (NOTE: Point out route traveled), it is clear from the sketch that a left turn on the road will take you to the intersection of the road and woodline (a checkpoint). If you deviate to the left, a right turn at the woodline would lead to the checkpoint."

(3) "The intersection is an excellent checkpoint because it offers an aid to navigation by a 'funnel' effect."

(4) "From the intersection, you can move out to the hill, a spot checkpoint located on otherwise flat ground. Since a spot checkpoint is more localized than the others, it is easier to miss, especially if it is not a prominent feature. There is nothing about a spot checkpoint to guide you in to it (like the road) unless it can be seen for a good distance or unless the slope of the terrain gives you a clue, such as may occur in a large hilltop."

d. (NOTE: Show Slide K-27. Title: Terrain Checkpoints)

(1) "Checkpoints can consist of single terrain features such as a hilltop located in a flat area or combinations of features such as ridgeline and hilltop."

(2) "Point One is a hilltop, an example of the spot type checkpoint." (POINT)

(3) "Point Two is a dry valley, an example of the line checkpoint."

(4) "Point Three is another example of the line checkpoint, an intermittent stream which would be visible as a dry stream bed in dry weather. This is also a valley line."

(5) "Point Four, a ridge leading to a hilltop, is an example of the line-spot checkpoint."

(6) "Point Five is the intersection of two valleys, more obviously the intersection of two streams, and is an example of the two line checkpoint."

e. (NOTE: Show Slide K-28. Title: Checkpoint Composition)

(1) "Each of the types of checkpoints may consist of different combinations of terrain, man-made objects, and vegetation."

(2) "Examples of the intersection of two lines could be: a crossroad, road and woods, stream and woodline, and meeting of two streams." (POINT)

(3) "Examples of the spot checkpoint could be: hilltop, building." (POINT)

(4) "Examples of the line and spot checkpoint could be: building on stream, building on road." (POINT)

(5) "Examples of a line checkpoint could be a woodline, road, stream." (POINT)

9. Checkpoint Recognition. Drill. (10 min)

a. (NOTE: Show Slide M-29. Drill)

(1) "For Slide M-29 on your answer sheet, circle the letter of the correct answer that identifies Checkpoint One. For example, if Checkpoint One were a crossroad, since choice (c) is a crossroad, you would circle letter (c) beside Point One on your answer sheet."

(2) "Which one of the following checkpoints is found at Point One?"

(a) "The alternatives are:"

(a) "road crossing a depression"

(b) "road crossing hilltop"

(c) "crossroad"

(d) "stream"

(NOTE: After 80% of the class have signified by raised hands that they have answered the question, call on a student by name, from the roster, to give the answer.)

(b) Answer: (b) road crossing hilltop

(NOTE: When the correct answer is given, point out the symbols that made the checkpoint.)

(c) "This is the symbol for an unimproved road (POINT), a broken line, and it crosses a contour line with no other contour line inside of it, a hilltop."

(d) "If your answer is wrong, place an X through it and check off the correct answer."

(3) "Which one of the following checkpoints is found at Point Two?"

(NOTE: Repeat alternatives; follow same answering and scoring procedure as above. Discuss symbol composition of checkpoint

when necessary.)

Answer: (c) crossroad

(4) "Which one of the following checkpoints is found at Point Three?"

Answer: (b) stream

b. (NOTE: Show Slide M-30. Drill)

(NOTE: With each new slide, state the number of the slide clearly and remind the student to move on accordingly on his answer sheet.)

(1) "Which one of the following checkpoints is found at Point One?"

(a) "Alternatives:"

(a) "house on stream"

(b) "junction of two streams"

(c) "house on woodline"

(d) "dry valley"

(NOTE: Follow the same answering and scoring procedure throughout the remaining slides. Repeat alternatives and discuss when needed.)

(b) Answer: (d) dry valley

(2) "Which one of the following checkpoints is found at Point Two?"

Answer: (c) house on woodline

(3) "Which one of the following checkpoints is found at Point Three?"

Answer: (b) junction of two streams

c. (NOTE: Show Slide M-31. Drill)

(1) "Which one of the following checkpoints is found at Point One?"

(a) "Alternatives:"

(a) "house on road" (c) "hilltop"

(b) "valley" (d) "ridge"

(b) Answer: (a) house on road

(2) "Which one of the following checkpoints is found at Point Two?"

Answer: (c) hilltop

(3) "Which one of the following checkpoints is found at Point Three?"

Answer: (d) ridge

d. (NOTE: Show Slide L-32. Drill)

(1) "Which one of the following checkpoints is found at Point One?"

(a) "Alternatives:"

(a) "stream and depression"

(b) "stream and road"

(c) "junction of two streams"

(d) "stream and pond"

(b) Answer: (d) stream and pond

(2) "Which one of the following checkpoints is found at Point Two?"

Answer: (a) stream and depression

(3) "Which one of the following checkpoints is found at Point Three?"

Answer: (b) stream and road

e. (NOTE: Show Slide L-33. Drill)

(1) "Which one of the following checkpoints is found at

Point One?"

(a) "Alternatives:"

(a) "dry valley"

(b) "house on a stream"

(c) "ridge"

(d) "junction of two wet valleys

(b) Answer: (d) junction of two wet valleys

(2) "Which one of the following checkpoints is found at Point Two?"

Answer: (b) house on a stream

(3) "Which one of the following checkpoints is found at Point Three?"

Answer: (a) dry valley

10. Clarity of Checkpoints (5 min)

a. (NOTE: Show Slide M-34. Title: Sharpness of Slope

(1) "Some checkpoints will be more easily recognized than others.

(2) "The sharper the slope of a terrain feature, the more easily it can be recognized."

(3) "With a sharp checkpoint, it is simple to locate your exact position."

(4) "With a checkpoint that extends over a large area, such as a broad hilltop, it is difficult to locate the exact center position."

(5) "When a checkpoint extends over a wide area, locate your position by estimating the midpoint between its limits. (POINT) On this broad hilltop the navigator traveled in these 2 directions until he was certain the ground was sloping down at these 2 limit points and then found the midpoint."

b. (NOTE: Show Slide M-35. Title: Sharpness of Woodline

(1) "The clarity of a woodline checkpoint depends on the contrast between the woods and the cleared land next to it."

(2) "If the woods stop abruptly at a clearing, the checkpoint is easily spotted." (POINT)

(3) "If second growth vegetation has obscured exactly where the woodline begins, again locate your position by estimating the midpoint between the limits of the woodline." (POINT)

c. (NOTE: Show Slide M-36. Title: Sharpness of Man-Made Features)

(1) "Sharpness of man-made features depends on the frequency of use and state of repair."

(2) "Examples of features which have become indistinct are:"

(a) "An abandoned house that has become overgrown with vegetation or destroyed by fire may be difficult to locate. (POINT) Only the foundations may be visible."

(b) "A dirt road or trail not used or maintained over the years would be another example. You must look closely for such checkpoints, particularly at night."

11. Map Orientation (10 min)

a. (NOTE: Show Slide M-37. Title: Map Orientation)

(1) "To locate yourself on a map in relation to your position on the ground, the map must first be oriented, that is, lined up so that the features on the ground are in the same position around you as they are on the map. You will apply this skill largely while enroute on a daytime mission."

(2) "One way to orient a map is by inspection; that is, if the ground features are clear, place the map so that the positions of the ground features correspond to their positions on the map. (For example, the crossroad is to the right, the hill and woodline is straight ahead.)"

b. (NOTE: Show Slide M-38. Title: The Map)

(1) "Another way to line up the map is to line up the magnetic north line of the map with a compass pointing to magnetic north."

(2) "The grid lines (POINT) on a map do not indicate magnetic north."

(3) "The difference between grid north and magnetic north varies from one locality to another since the variance depends on your location in relation to the magnetic field in northern Canada."

(4) "To find the difference, note the diagram at the bottom right of the map and the scale at the top right."

c. (NOTE: Show Slide M-39. Title: Magnetic North Scales)

(1) "At left is an enlarged view of the diagram."

(2) "The diagram tells by how many degrees--in this case, 10°--the magnetic north direction angles off from grid north."

(3) "On the top of the map there is a scale marked off in degrees, and at the bottom, there is a pivot point labeled 'P'."

d. (NOTE: Show Slide M-40. Title: Draw Magnetic North Line)

(1) "Mark off the number of degrees (10°) on the scale at the top right of the map and then draw a line from pivot point 'P' to the point on the scale."

(2) "This line represents the direction of <u>magnetic north</u> for the locality of this map."

e. (NOTE: Show Slide M-41. Title: Map is Lined Up With Compass.)

"To line the map up with the compass:"

(1) "The student faces magnetic north, 360°."

(2) "The magnetic north line drawn on the map is then placed directly under and lined up with the sight wire of the

compass. The North arrow of the compass points toward the top of the map."

f. (NOTE: Show Slide M-42. Title: Map is Oriented)

(1) "Once the lining up procedure is completed, the map is oriented to magnetic north; the North arrow, index line, and sight wire on the compass are in line with the magnetic north line on the map."

(2) "The compass may be taken away, but once oriented, the map should not be moved since any change in position will move it out of line with magnetic north."

12. Map Orientation (5 min) (LIGHTS ON)

(NOTE: Each student is equipped with a 1:25,000 topographic map, a compass, and pencil. The student on the left commences as pupil; the other acts as coach. Run through the following checklist for each man)

a. "Open the map out flat with the diagram near you."

b. "Find the number of degrees that magnetic north varies from grid north."

c. "Locate this degree reading on the scale at the top of the map."

d. "Draw a line connecting this degree reading with 'P' point at the bottom of the map, using one edge of the map as a straight edge."

e. "Face north with the compass."

f. "Place the magnetic north line of the map directly under the sight wire of the compass with the North arrow of the compass pointing toward the top of the map."

(NOTE: If maps are placed on desks, warn against possible iron interference from nails and screws. Repeat the procedure with coaches and pupils in opposite roles. Depending on the orientation of the classroom, students may have to use the desks behind them.)

13. Review of Checkpoints and Map Orientation (7 min)

a. (NOTE: Show Slide M-43. Title: Correction Value of Checkpoints [Review])

(1) "A spot checkpoint (hilltop or house) gives full correction in distance and direction."

(2) "A two line checkpoint (crossroads, road and woodline) gives correction in both direction and distance."

(3) "A line-spot checkpoint (ridgeline and hilltop, house on stream) gives correction in both distance and direction."

(4) "A line checkpoint parallel to the route (road, stream) gives correction in direction only."

(5) "A line checkpoint perpendicular to the route (valley line, ridgeline) gives correction in distance only."

b. (NOTE: Show Slide M-44. Title: Sharp and Vague Woodline [Review])

"The checkpoint is located at the midpoint of the limits of the woodline."

c. (NOTE: Show Slide M-45. Title: Magnetic North Line Drawn [Review])

(1) "Magnetic north is NOT the same as grid north."

(2) "To find the magnetic north line on your map, find the number of degrees it varies from grid north on the diagram at the bottom of the map; mark off this number on the degree scale at the top of the map; and draw a line to this point from point 'P'."

d. (NOTE: Show Slide M-46. Title: Map is Oriented [Review])

"To orient the map, line up the magnetic north line of the map with a compass pointing to magnetic north. The magnetic arrow, index line, sight wire, and magnetic north are all in line with the magnetic arrow pointing toward the top of the map."

14. Scoring and Administration (3 min)

a. Answer sheets

(1) "Place your names on the answer sheets."

(2) "Add up the total number of wrong answers and place that number in the square on the upper right of Page 1 of the answer sheet."

(3) "Pass your sheet to the right."

b. "You may retain the maps with which you have been working during this period. Use the map to review what you have learned in class. Your unit area is marked with a rubber stamp to aid you in orienting the map."

c. "Do you have any questions?"

BREAK (10 min)

PATROL I: LAND NAVIGATION

LESSON PLAN

PERIOD FOUR

MAP-TERRAIN ASSOCIATION

HOUR: 9 and 10 of 12

INSTRUCTION TIME: 120 minutes

PURPOSE: To impart, through limited, critiqued, practical application, understanding of principles governing ground recognition of map-selected terrain features and their utilization as checkpoints during land navigation.

INSTRUCTOR REFERENCES: FM 21-26, Chap 2; Instructor's Guide, PATROL I, Period Three.

TRAINING AIDS:

Per Principal Instructor (PI):

1 Enlarged map of the training area, 4' x 4'
1 Checkpoint checklist
1 Whistle, thunderer

Per Group Assistant Instructor (AI):

1 Plastic relief map, 1:25,000, of training area, with checkpoints marked, or equivalent
1 Checkpoint checklist (see App II, Sec IV)
1 Whistle, thunderer

Per Student:

1 Map, appropriately marked, 1:25,000
1 Route sketch of training area

STUDENT UNIFORM AND EQUIPMENT: Uniform DLR
1 Clipboard
1 Compass, lensatic
1 Pencil
1 Sheet of paper

PHYSICAL FACILITIES: Map-Terrain Association Facility (See App III, Sec IV)

PERSONNEL: 1 PI
1 AI per 10 students
1 Aid Man

ORGANIZATION: Prior to orientation, divide students into 10-man groups and assign an AI and a number (from 1 to 8) to each group. Issue training materials. After orientation, groups move out to respective starting positions with AI's in charge.

TRANSPORTATION: As required

SAFETY FACTORS: Aid man with ambulance. Each AI equipped with whistle. If injury occurs, AI sounds whistle three times to summon aid.

TIME BREAKDOWN

Time in Minutes	Type of Instruction	Subject
5	C	General Orientation (PI)
15	C	Movement to and orientation at first checkpoint
70	D, PE	Traversing route and critique at successive checkpoints
15	D	Return to first checkpoint and group critique
5	—	Return to central point from last checkpoint
10	—	BREAK

LESSON OUTLINE

1. General Orientation (PI) (5 min)

(NOTE: Assemble at central area. Insure that each student has one compass, one pencil, one sheet of paper, one map of the training area, and one route sketch blank.)

a. Purpose

(1) "Usually a compass and azimuth will be used to navigate across a piece of terrain. In Period Four, routes are marked on the ground."

(2) "Only the map and checkpoints will be used while traversing a piece of terrain."

(3) "The map will be used to locate specific ground features; points on the ground will be used to help locate your position on the map."

(4) "Dead reckoning navigation puts the navigator in the near vicinity of his checkpoint; the checkpoint permits readjustment."

b. Procedure

(1) "When directed, each AI will move his group of ten students to his first checkpoint."

(2) "The number of the first checkpoint will be the number assigned to the group."

(3) "The group will move from one point to another in consecutive numerical order. Point 1 comes after point 8."

(4) "When the group returns to its first checkpoint, it will reassemble at the central point."

(5) "At each checkpoint each man will orient his map by compass."

(6) "Then any student may be called by the AI to answer any of the problems which follow."

(NOTE: AI will organize his group into buddy pairs. After asking a question he will permit them time to discuss the answer before calling upon a specific student.)

(a) "Locate own position on map."

(b) "State type and information checkpoint gives."

(c) "Specify and point out slope and clarity of the checkpoint on the map and on the ground."

(d) "Locate and identify surrounding ground forms on the ground and on the map."

(e) "Name the next checkpoint and point in its direction."

(f) "Describe the terrain that will be traversed enroute to the next checkpoint."

(g) "Measure the distance between checkpoints."

c. Route Description

(NOTE: Refer to 4' x 4' enlarged map of training area.)

"Each checkpoint is marked on the enlarged map as well as on each individual map."

(NOTE: The PI will point out on the map and describe each checkpoint with reference to all entries in Fig 30, App II, Sec IV, first three columns, completely covering one checkpoint at a time. The map will be oriented. Groups will then move out to first checkpoint. The group number corresponds to the number of their first checkpoint.)

2. Movement to and Orientation at First Checkpoint (15 min)

a. "Each student will construct a distance scale ruler from the meter scale on the map."

b. "At every checkpoint, each student will orient his map by lining up the magnetic north line of his map with the compass set at 360°."

c. "The following will be standard procedure upon reaching each checkpoint." (NOTE: Refer to the checkpoint checklist for correct answers. Utilize plastic relief map for clarification of references to slope, checklist, column 3. Call on different students to answer the following questions.)

(1) "Name and locate this checkpoint on the map." (NOTE: Refer to Fig 30, column 1.)

(2) "What type of checkpoint is this and what sort of information does it give you?" (NOTE: Refer to Fig 30, column 2.)

(3) "In which directions does the ground slope and how sharp is the checkpoint?" (NOTE: Refer to Fig 30, column 3.)

(4) "Identify the features around you by noting their position on the ground and on the map." (NOTE: Refer to Fig 30, Column 4.)

(5) "Name the next checkpoint and point in its direction." (NOTE: Refer to Fig 30, column 1; direction is found by inspection of oriented map.)

(6) "What is the distance between this and the next checkpoint?" (NOTE: Refer to Fig 30, column 5.)

(7) "Describe the terrain that will be traversed enroute to the next checkpoint." (NOTE: Refer to Fig 30, column 6.)

(NOTE: The AI should satisfy himself that the group as a whole is aware of the terrain to be traversed and the appearance of the next checkpoint. Refer to the checklist to insure complete coverage of each point. When the PI's whistle is heard, the group will move out.)

3. Traversing Route and Critique at Successive Checkpoints (70 min)

(NOTE: Throughout the traverse, the AI should allow a different student to lead the group on each leg to allow unobstructed view of the terrain for each on at least one leg; however, each student will proceed as if he were acting alone. The whistle will sound every ten minutes, beginning 15 minutes after the end of the PI's orientation to signal movement to next checkpoint.)

4. Return to First Checkpoint and Group Critique (15 min)

(NOTE: Sub-paragraphs a and b are notes to the AI.)

a. When the group has completed the course and has returned to its initial checkpoint, a general critique will be held.

b. Review

(1) Checkpoints used (name and type - Fig 30, columns 1 and 2)

(2) Type of information they give (distance, direction - Fig 30, column 2)

(3) Ease or difficulty of location (sharpness - Fig 30, column 3)

(4) Problems encountered

(5) Encourage questions

(NOTE: The following narrative is given by the AI at the site of the first checkpoint revisited.)

c. Route sketch

(1) "When a soldier is given a mission, a map might not be available to take along. In this case, by referring to a map before departure, he makes a route sketch containing all pertinent information about the route to be traveled."

(2) "If this were completed for each checkpoint, one could use this sketch instead of a map, given the proper azimuth readings, to reach the next checkpoint."

(3) "On the route sketch blank, there is a sketch of the route just traversed and information blocks which each man will fill out now. I will give the correct answers when you finish."

5. Return to Central Point From Last Checkpoint (5 min)

(NOTE: AI will move his group back to the assembly area on the whistle signal.)

BREAK (10 min)

PATROL I: LAND NAVIGATION

LESSON PLAN

PERIOD FIVE N

NIGHT LAND NAVIGATION EXERCISE

HOUR: 11 and 12 of 12

INSTRUCTION TIME: 120 minutes

PURPOSE: To impart, through critiqued practical application under conditions of limited visibility, limited skill in land navigation over unfamiliar terrain based upon a combination of dead reckoning and terrain recognition derived from map study.

INSTRUCTOR REFERENCES: Instructor's Guide, PATROL I, May 1958, all previous periods; FM 21-26 par 52, p. 126-129, 133, 136, 137, 141, 142

TRAINING AIDS: Per PI:

1 Chart, "Two Typical Routes, Night Land Navigation Course" (Fig 36) w/easel (see App II, Sec V)
1 Panel, terminal point (see App III, Sec V and Fig 57)
1 Map, 1:25,000, w/training areas and corrections marked thereon
1 Roster of 2-man teams showing course designation (Course Red or Blue), Order Nr, and Starting Point Nr
1 Roster, AI Assignments
1 Lantern, electric, red-shielded, w/extra battery
1 Compass, lensatic
1 Watch, wrist
1 Clipboard
2 Pencils
1 Radio, AN/PRC-6 w/extra battery
1 Envelope, large, for collecting Route Information Cards

10 Route Information Cards (blank) (see App II, Sec V)
1 Box or carton for transporting equipment

Per Aid Man:

1 Ambulance w/2 litters (See NOTE below.)
1 First aid kit
1 Snakebite kit
1 Latern, electric w/extra batteries
1 Map, 1:25,000 w/training areas marked thereon
1 Radio, AN/PRC-6 w/extra battery

(NOTE: On monotonous terrain it may be necessary to separate the triangular courses by considerable distance to insure availability of easily recognized terrain features as objectives. In such cases, the aid man and the ambulance must be centrally located or two ambulances must be employed. The PI will control and direct aid to any required location. A safety and evacuation plan must be devised and coordinated by the PI for each specific locale. The radio net will be kept open to aid in such coordination throughout the exercise. Since maps are often out of date, recent aerial photographs and ground reconnaissance should result in corrected copies of the maps employed to facilitate treatment and evacuation.)

Per AI: (Starting Points and Final Objectives)

1 Roster of 2-man teams showing course designation, Order Nr, and Starting Point Nr
1 Whistle per 2-man team
10 Briefing maps w/routes inscribed (see App II, Sec V)
1 Route Information Card per 2-man team to be dispatched. (see App II, Sec V)

(NOTE: Route Information Cards must be prepared prior to formation of troops for the exercise.)

1 Objective locator scale (see App II, Sec V)
1 Notebook, pocket-size
2 Flashlights, red-shielded w/extra batteries
1 Compass, lensatic
1 Clipboard
2 Pencils, lead
1 Radio, AN/PRC-6, w/extra battery
1 Belt, cartridge, w/first aid kit and canteen
1 Envelope, large, for collecting Route Information Cards
1 Box or carton for equipment
1 Poncho or shelter half (light screen)

(NOTE: The poncho or shelter half is erected as a vertical screen between the AI's station in rear of the objective and the incoming route to preclude the AI's flashlight serving as a beacon to incoming students. While this is not a testing situation, both noise and light should be kept at an absolute minimum to maximize realism.)

Per AI: (Initial Objective)

1 Roster of 2-man teams showing course designation, Order Nr, and Starting Point Nr
1 Briefing map w/route indicated (see App II, Sec V)
1 Objective locator scale (see App II, Sec V)
2 Flashlights, red-shielded w/extra batteries
1 Compass, lensatic
1 Clipboard
1 Notebook, pocket-size
2 Pencils, lead
1 Radio, AN/PRC-6, w/extra battery
1 Belt, cartridge, w/first aid kit and canteen
1 Poncho or shelter half (see preceding note)
1 Box or carton for equipment
1 Pencil, grease, black

STUDENT UNIFORM AND EQUIPMENT:

Uniform DLR w/gloves, shell, leather (briar protection), and belt, cartridge
1 Compass, lensatic
1 Pencil
1 Notebook, pocket-size
1 Tent rope or shoestring

PHYSICAL FACILITIES:

Classroom or equivalent outdoor area for organization, orientation, and map study.
1 Night Land Navigation Course (3 objectives, 10 starting points) per 40 students (see Fig 57 and App III, Sec V)

PERSONNEL:

1 Principal Instructor (PI)
2 Assistant Instructors (AI) per initial objective (AI's Nr 3 and Nr 4)
1 Assistant Instructor per final objective (AI's Nr 1 and Nr 2)
Aid Men as required by local terrain

ORGANIZATION:

Students organized into 2-man teams, assigned to specific navigation courses, orders, and starting points. Organization, orientation, distribution of equipment, and supervised map study occur in unit area or at a designated central point prior to distribution of students to starting points. At starting points, each 2-man team is afforded an opportunity to view an oriented map for a period not to exceed two minutes and is dispatched to the initial objective. Critique occurs on arrival at initial objective, and team is dispatched to final objective. Individual teams are again critiqued. A safety check of personnel and a brief general critique are held by each senior AI at the entrucking point.

TRANSPORTATION: 1 1/4-ton truck (PI)
1 Ambulance w/litters and searchlight
Troop carriers as required

SAFETY FACTORS: Local SOP for night training is applicable. Each 2-man team carries a whistle. If injury occurs, whistle is sounded. AI's at course involved obtain sound fix on whistle by triangulation, coordinate movement of ambulance and/or first aid by AN/PRC-6. Each AI will have one extra flashlight. Should he be required to leave his post to aid in evacuation, he will detail a student to man the objective and postpone critiquing of teams. If no student is available, the AI will mark his position by leaving a burning red flashlight, pointed to the rear, behind the light screen. Truck horns and lights will be employed as assembly aids on termination of the problem. Senior AI at each course will conduct roll call prior to entrucking for return to unit area. Status of personnel will be reported to PI on termination of the exercise. (See App III, Sec V)

TIME BREAKDOWN

Time in Minutes	Type of Instruction	Subject
10	C, D	Orientation
10	C, PE	Map study and briefing
10	---	BREAK (Second order only)
35	PE	Dispatch and navigation to initial objective
5	C, D	Critique of teams (Initial objective)
35	PE	Dispatch and navigation to final objective

Time in Minutes	Type of Instruction	Subject
5	C, D	Critique of teams (Final objective)
10	—	BREAK (First order only)
10	C	Termination and critique of the problem

(NOTE: Only 10 minutes of the total time is allotted to breaks. Second order is dispatched 10 minutes after the first order. This distributes the students spacewise and diminishes number of students converging on one objective at a given time. Second order completes the problem 10 minutes after first order. During this time, first order students who have completed the exercise receive 10 minute break in holding area in rear of final objective AI stations.)

LESSON OUTLINE

1. Orientation (PI) (10 min)

(NOTE: Procedure pertains to action by instructor personnel; Instruction, as set forth in quotation marks, is content delivered verbally to students.)

a. Procedure

This phase of training is conducted in a suitable classroom with adequate light for reference to 1:25,000 maps. Courses are designated as Course Red and Course Blue. The PI orientation applies to all participating personnel. The procedure following is based upon the action by AI's at one course; it applies equally to both courses. Rosters of assignments of AI's and students are published on the bulletin board in sufficient time to permit familiarization with assignments prior to the formation. The senior AI at each course is designated AI Nr 1 and is responsible to the PI for all phases of organization and training at the designated course.

(1) Prior to class time, PI assembles all AI's and insures that each AI has all required equipment.

(2) Student 2-man teams, for each course, are organized into two groups. Group 1, under AI Nr 1 (assisted by AI Nr 3), consists of 2-man teams, both orders, assigned to starting points 1-5. Group 2, under AI Nr 2 (assisted by AI Nr 4), consists of

2-man teams, both orders, assigned to starting points 6-10.

(3) Immediately upon assembly of troops, designated AI's will issue the following items to the personnel indicated:

(a) 1 Briefing Map (App II, Sec V) per two 2-man teams (both orders) assigned to each starting point

(b) 1 Route Information Card per 2-man team

(c) 1 Whistle per 2-man team

(4) Throughout the orientation, AI's will remain with their groups.

b. Instruction (PI)

(NOTE: Chart (Fig 36), "Two Typical Routes, Night Land Navigation Course" (App II, Sec V), and sample of terminal line panel are uncovered when the PI commences the orientation.)

The PI will employ the following outline:

(1) "Purpose of the exercise is to provide each 2-man team with an opportunity to navigate accurately over unfamiliar terrain during limited visibility using dead reckoning to reach the vicinity of the objective and terrain recognition derived from map study to correct to an accurate pinpoint location of the objective."

(2) "Typical routes and procedure are indicated by this chart (POINT). This is what you will do:"

(a) "Before you leave here you will study the map route indicated by your AI so that you will know what to expect terrain-wise over the entire route, both legs - both objectives. You will have no map or artificial light while navigating."

(b) "We will move by truck from this area to the starting points. Depart the starting point (POINT) on your assigned azimuth, the first azimuth shown on the Route Information Cards, on order from your AI."

(c) "Navigate by dead reckoning, using your compass, and counting and recording paces until you believe you are in the vicinity of the objective."

(d) "Carefully study the terrain, particularly at the end of each leg, then determine from this study where the true objective is located and move to that location. There will be no AI or artificial marking at the pinpoint objective."

(e) "At the selected pinpoint objective, record the distance measured by you from the last starting point. Look at the blocks on your Route Information Cards on the side where your missions are shown. You write this distance in meters on your Route Information Card in the space marked GROUND DISTANCE."

(f) "The first azimuth on your card, X-A, directed you to the vicinity of the objective. The second azimuth, labeled CBJ-AI, will direct you to the AI. Move out on this azimuth, counting your paces, until you reach a band of white engineer tape stretched across your path. At the tape, record the distance in meters from the objective to the tape as paced by your team. After recording the distance from the pinpoint objective to the tape, search along the tape and locate the nearest panel. The panels on the taped line look like this (POINT). Record the panel number on your card. An arrow also appears on the bottom of the panel. Move along the tape in the direction indicated by the arrow until you locate the AI who will tell you how close you came to the pinpoint objective."

(g) "After the critique, the AI will direct you to follow the tape in a given direction to a specified panel number (POINT). On reaching your panel number (POINT), consult your Route Information Card and move out to the final objective (POINT), on the azimuth obtained from the card."

(3) "Final objective procedure is the same as for the initial objective. I will repeat this procedure."

(a) "Navigate by dead reckoning to the vicinity of the objective." (POINT)

(b) "From your knowledge of the terrain gained during map study, correct to the pinpoint location of the objective."

(c) "Record the distance from the last starting point to the pinpoint objective."

(d) "Move out on the CBJ-AI azimuth, counting paces, until you reach the tape." (POINT)

(e) "Record the distance paced from the pinpoint objective to the tape."

(f) "Search along the tape (POINT) for the nearest panel (POINT) and record the number of the panel on your Route Information Card."

(g) "Move along the tape (POINT) in the direction of the arrow shown on the panel (POINT) until you locate the AI. Report to the AI and give him your Route Information Card bearing the panel number and the distances paced so he can critique your performance. Do you have any questions?"

(4) "Safety is of primary importance. Each team has a whistle. Should a man be injured, the team will halt in place and the uninjured teammate will blow long blasts until an aid team arrives. It is very unlikely that anyone will be required to blow a whistle tonight."

(5) "Termination of the problem will be signalled by sounding of truck horns and display of vehicle lights in the vicinity of the starting points. If you have not completed the problem on these signals, move directly to the nearest trucks and report immediately to the nearest AI."

(6) "Throughout the problem you will work quietly, without lights. There will be no smoking enroute (a range fire could cost your lives). Confine your talk to whispers to your teammate only between objectives. Keep your voices down during the critique at the objectives. Do you have any questions? AI's, commence map study and brief your students on their assigned routes. On loading for moving to the training areas, insure that they are properly equipped and loaded on the vehicles according to orders and starting points for the courses concerned."

2. Map Study and Briefing (AI's) (10 min)

a. Procedure

(1) Map study and briefing are conducted by AI Nr 1 for Group 1 and AI Nr 2 for Group 2, each course. Where students for two courses are being briefed simultaneously, the groups utilize the four corners of the classroom to minimize interference.

(2) Immediately after the instruction (par 2b, below), AI's for each group brief four men at a time (two 2-man teams assigned each starting point). Students already briefed will

utilize the time for map study as will students waiting to be briefed.

(3) AI in charge of each group will insure that students are properly uniformed and equipped. Discrepancies will be corrected prior to departure from the unit area.

b. Instruction (AI Nr 1 or AI Nr 2)

"Look at the routes on your maps. The route is V-shaped, the V pointing to the (direction). Your objectives are hilltops. On a longer route, these objectives might be checkpoints instead of objectives. Study your routes, particularly the objectives and the route as it approaches the objective. Study the features along the routes to include slope, vegetation, drainage lines, distances, and directions. Be prepared to describe the objectives as we AI's move to each 4-man sub-group."

(NOTE: AI's move from sub-group to sub-group, briefing and answering questions, using Briefing Maps in hands of students as training aids.)

3. Dispatch and Navigation to Initial Objective (AI's 1 and 2) (35 min)

a. Immediately upon arrival at the field training area, AI's 3 and 4 proceed to the initial objective, erect their light screens (ponchos), and report arrival to AI's Nr 1 and 2 by radio. PI must insure that all AI's 3 and 4 are in position prior to the arrival of troops at their objectives.

b. AI Nr 1 guides both orders from the detrucking point to assigned starting points 1-5. As he arrives at each starting point, commencing at Nr 5, he orients the map, points out the ground and map locations of the starting point and ground direction of both objectives, gives the team an opportunity to ask questions, and dispatches the first order team, instructing the second order team to stand fast. On dispatching the last team of the first order from starting point 1, AI Nr 1 returns to starting point 5 and repeats the process for second order. On dispatch of last team at starting point Nr 1, AI Nr 1 moves directly to the left flank final objective, nearest to starting point Nr 1, erects his light screen (poncho) at the center point of the tape (panel 7), and prepares to receive students on arrival from initial objective. AI's 3 and 4 are notified by AI Nr 1 using AN/PRC-6, so that no students arrive at unmanned objectives.

c. AI Nr 2 guides both orders to starting points 6-10. Commencing at starting point 6, AI Nr 2 follows essentially the same dispatching procedure for his group as prescribed for AI Nr 1 in the preceding sub-paragraph. AI Nr 2 then moves directly to the right flank final objective, nearest to starting point 10, erects his light screen (poncho) at the center point of the tape, and reports by AN/PRC-6 to AI's 3 and 4 that he is ready to receive troops.

4. Critique of Teams (Initial Objective) (5 min)

a. Procedure

Critique will occur as 2-man teams arrive at the AI stations on the terminal tape. AI's 3 and 4 will erect their light screens (ponchos) between panels 7 and 8 immediately on the objective side of the terminal tape with sufficient distance between the screens to prevent interference.

(1) On arrival at the AI station, each team reports the following to the AI by presenting the Route Information Card.

(a) Ground distance in meters as paced from starting point to pinpoint objective selected by the team.

(b) Distance in meters as paced by the team from selected pinpoint objective to tape line.

(c) Nearest panel number to team terminal point on taped line.

(NOTE: An objective locator scale [App II, Sec V] is used by the AI to locate the student-selected objective as reported. This scale should not be shown to the students. It furnishes clues permitting the terminal tape and panels to serve as references to location of the true objective. First order students might aid their fellow students by furnishing information to men in the objective area.)

(2) AI makes proper entries on Route Information Card, locates point selected by student as objective, uses an oriented 1:25,000 map with pointer (pencil) and scale to furnish the instruction to the team.

(3) AI will enter the arrival time for each team on his roster as well as on the team's Route Information Card.

(NOTE: Should a team become disoriented and not respond to the horn-light signals at the end of the problem, the time notations on the rosters would indicate the team's last known location.)

b. Instruction

(1) "You are now located here." (POINT)

(2) "The true objective is here." (POINT)

(3) "The ground distance from the starting point (POINT) to the objective is ___ meters, essentially the same as the map distance. You were asked to record it to emphasize the importance of counting paces correctly."

(4) "The point selected as the objective, according to your panel and distance report, is here." (POINT)

(5) "You were (number) meters (SHORT or OVER) and (number) meters (RIGHT or LEFT) of the true objective."

(6) "The (significant features, such as slope, vegetation) (POINT) should have aided you to locate the objective accurately. Had this been a checkpoint instead of an objective you would not have been corrected here and the error (if any) would have increased the difficulty of locating your next checkpoint or objective. Do you have any questions?"

5. Dispatch and Navigation to Final Objective (AI's 3 and 4) (35 min)

a. Procedure

Dispatch occurs for each team immediately upon completion of critique. Starting point numbers at the initial objective coincide with the starting point numbers originally assigned. Critiquing AI at initial objective will use a grease pencil to line out the directions and distances no longer appropriate on the Route Information Card and direct each team to move along the tape to the panel number designating the assigned starting point. From this point each team navigates to the final objective.

b. Instruction

(1) "Look at this map. The map is oriented; your next objective is here." (POINT)

(2) "Your starting point number, as shown on your Route Information Card is ___."

(3) "Move out along the tape in that (POINT) direction to panel number ___, your starting point location."

(4) "From that point, take your next azimuth to the final objective. Follow the same procedure for objective location, pace counting and panel selection at that objective as you did at this one. Try to improve your accuracy. Do you have any questions? Move out."

6. Critique of Teams (Final Objective) (AI's Nr 1 and 2) (5 min)

Routes are so plotted that one half (ten 2-man teams) of the students are directed to each of the two final objectives. The AI critiquing teams at each of the two final objectives follows the procedure set forth in paragraph 4, above, in critiquing his teams on arrival. After critique, AI's retain Route Information Cards, check the team from the roster, and direct the team to move quietly to a holding area in rear of the center of the taped line at each position. Students will remain quietly in these holding areas near each final objective until the problem is terminated.

7. Termination and Critique of the Problem (Senior AI) (10 min)

a. Each AI will maintain his copy of the student roster by checking arrivals and departures so that all objectives may be closed immediately upon arrival of the last team at the assigned final objective. To insure proximity of aid to students who may be injured or disoriented, all objectives will be manned until all personnel have completed the problem and are again under the direct control of the AI's. The senior AI at each course will employ his radio net to coordinate closing of objectives and assembly of personnel at the entrucking point. The PI will be informed by radio when all personnel have been accounted for and are physically present at the entrucking point.

b. Senior AI at each course will critique the performance of students on the basis of information obtained from his observations and those of the other AI's at the course. Students should be encouraged to ask questions and make relevant comments. AI's will be prepared to furnish information pertinent to the following:

(1) Accuracy of location of the objective to include

approximate number of teams who navigated to within 25, 50, 75, 100, and 200 meters of the true objective.

(2) Major apparent failures to recognize and take advantage of prominent terrain references pointed out on the map prior to the exercise.

(3) Any failures to comply with instructions that involved accurate navigation, tactical soundness (e.g., smoking, unauthorized use of lights, etc), or acts prejudicial to good order and discipline (e. g., malingering). Emphasis will be upon prevention of recurrence.

(4) Outstanding performance (for example, navigation to within 25 meters of both objectives) by individual teams.

(NOTE: To insure that factual information is available for the critique, all AI's will make notes throughout the exercise, review Route Information Card data, and be prepared either to furnish information to the senior AI or to comment specifically during the critique.)

c. PI will employ his radio net to coordinate return of troops to unit areas in one convoy. The ambulance with aid man should be the last vehicle in the convoy during all movement.

d. PI will collect all Route Information Cards and rosters on completion of the problem, place them in a single envelope and deliver them to Task Leader, Task PATROL, to facilitate evaluation of student training.

APPENDIX II

TRAINING AIDS

1. Slide Production

Land Navigation Training makes use of 4 x 5 inch film slides as teaching devices in Periods One and Three. Some generalizations can be made of the requirements for the slides, to aid in the later individual slide descriptions set forth within the following pertinent sections of this Appendix. The generalizations apply to content, format, size, and black-white and color.

a. Content

The slides show soldiers engaging in the various skills of land navigation. Essential equipment and its employment over the terrain being traversed is depicted. Unless specified otherwise, soldier participants appearing in the slides are dressed in the fatigue uniform. In some close compass-sighting shots, the soldiers appear bareheaded. Sketches are employed in lieu of the actual object when simplicity and clarity so dictate. Maps, scale 1:25,000 and 1:12,500, of Fort Benning, Georgia, are employed. The compass shown is the standard Army issue, lensatic type, with graduated straight edge. Overhead close-ups of the compass are presented as having been taken over the trainee's shoulders or head; therefore, the index line is always shown in the upper portion of the slide. The long luminous line generally is kept in the rear half of the dial, near the eyepiece. The terrain is intended to be characteristic of uninhabited countryside. Vehicles and buildings, particularly of civilian design and usage, have been avoided. Roads are shown only when essential to the teaching point involved and usually are of dirt type. Woods and clearings frequently appear as backgrounds or as integral parts of the composition. Focal points are correlated from left to right with the order of treatment in the accompanying, coordinated narrative.

b. Format

The index number and title of each slide are set at the top edge, extending the full hroizontal and approximately one-fifth of the vertical dimensions of the total slide area. The index numbers, appearing in the top left corner of each frame consist of an identifying letter (e.g., "C" for Compass), followed by a dash and the numerical order of presentation, the first slide in compass instruction being indexed as C-1. The index number

aids the instructor in associating the slide with the narrative and permits the trainee to correlate rapidly the visually presented questions with the correspondingly indexed space on the Answer Sheet during slide drills. Incorrect answers on multiple choice questions in reading the scale were selected so as not to appear obviously wrong. Each choice could appear correct if not carefully scrutinized by the trainee. Slide titles extend from the top left of each frame either as questions or as identifying labels. While titles generally consist of a single line of two or three words, the multiple choice slides contain five lines, the title and four multiple-choice answers. Index numbers and titles appear in white on black background. Unless otherwise specified, backgrounds for life slides will be mono-colored, providing the best possible contrast with the subject. The background should produce the least glare possible.

c. Size

The subjects are photographed at distances varying from close-up to several hundred yards. The purpose has been to present the subject so that it occupies the total vertical length of the completed slide. Slides are classified according to whether they are color or black and white, sketch or life (3D photo), and close-up or panoramic shot. The classifications are as follows:

Color = C
Black and White = B
Sketch (copy) = S
Life (3D shot) = L
Close-up = CU
Panoramic = P

d. Minor Variations

Due to difficulties encountered in duplicating exactly the desired subject matter, the slides may vary in minor detail from the descriptions set forth; however, the content of each slide is deemed to be realistically emphatic and basically sound insofar as the specific teaching points involved are concerned.

(NOTE: Sketches and actual slides of the total slide requirement for PATROL I training are contained in a folder, PATROL I LAND NAVIGATION FILM SLIDE REQUIREMENTS, SPRING 1958, at the U. S. Army Infantry Human Research Unit Library, Fort Benning, Georgia.)

2. Chart Production

Chart sketches are drawn proportionally to the 30 x 40 standard stock, in 6 x 8 outline sketches. Titles of charts are centered on top of charts. Title letters will be 2" high. Border will be placed 1" from edge of chart. Natural color will be used for the outdoor sketches.

3. Description and Utilization of Scorecards

a. The scorecards required for each trainee during these courses may be reproduced locally by mimeograph process; however, for use in any quantity, reproduction by Army Field Printing Plant facilities is strongly recommended.

(NOTE: The universal application of the tables of missions for the courses obviously makes feasible reproduction of the cards to include missions, should rapid mobilization require large numbers of men to be trained simultaneously. Packaging of cards containing specific missions would, of course, be based upon the total number of men to be trained at any given installation and should provide for full operation of the field physical facilities involved. The economy of time and funds, particularly the former, is apparent upon consideration of the basic problem as related to the design of this part of PATROL I training.)

b. The AI must insure that start-stake assignments and missions are entered (in those scorecards which warrant them) prior to the period of instruction. Data required for entry on the scorecards for courses "Compass Sighting," "Sighting Range," "Maintaining Direction While Moving," "Detouring," and "Dead Reckoning" is set forth in the tables included in paragraph 3 of App II, Sec I, and paragraph 5 of App II, Sec II. Start-stake numbers for course "Applying the Standard" are derived from the Scoring Key as indicated in Fig 21, App II, Sec II. This information is written on the card by the student on the course upon instructions from the AI.

4. Compass Accuracy and Luminosity

The standard Army issue lensatic compass, with graduated straight edge, is employed by students in all training involving direction, throughout the PATROL I course of instruction. U.S. Army Ordnance requires this compass, when new, to be accurate to within plus and minus 10 mils. The PATROL I program can tolerate inaccuracy in the used compass up to plus or minus two degrees. However, any inaccuracy beyond two degrees would tend seriously to interfere with training.

(NOTE: In an inspection completed 9 April 1958, at Fort Benning, Ga, 500 compasses in current training usage were evaluated for accuracy. It was found that 12.8% of these compasses deviated more than plus or minus 2 degrees when sighting on a known true azimuth.) Inaccurate compasses should not be issued to students. Normally there is a variation in the degree of clarity with which compass dials may be read at night. In some the luminous paint appears to have dimmed, and the contrast with the dial numbers is reduced. In others the glass appears to be cloudy. (NOTE: The dullness of the glass is sometimes caused by moisture condensation, particularly in humid climates. This can be eliminated by placing the compass in the sun to dry the glass. Other cases of dullness are not caused by moisture.) Such compasses cannot be read in the dark and should not be issued to students for use in PATROL I training. The PI of the period concerned is immediately responsible for the quality of compasses issued to the students for use during his period of instruction. Valuable training time should not be lost by requiring students to attempt to work with unserviceable compasses, nor should the inexperienced student be required to attempt to determine the degree of accuracy or luminosity available in the compass issued to him. The unit issuing the compasses to the students should be charged with the elimination of unserviceable compasses. (NOTE: Unserviceable compasses should include those compasses with broken, clouded, or cracked cover glasses, missing or bent sight wires, and bent eyepieces.) The following procedures may be employed for the required inspection of compasses:

a. Inspection for Unserviceable Compasses

(1) All the compasses should first be opened to see that the cover glass is not broken, clouded, or cracked.

(2) The front cover should be inspected to see that the sight wire is not missing or bent.

(3) Next, the eyepiece should be placed flat against the cover glass. The index line on the cover glass should bisect the sight slot. Then with the compass closed, it should be noted that the sight wire also bisects the sight slot. This procedure will insure the inspector that the eyepiece is not bent.

b. Inspection for Accuracy

(1) Select an outdoor area where the influence of metal or powerlines is eliminated and a working distance of 100 to 150 feet, cleared of obstructions to the line of sight, is available.

(2) At the inspection point, build a wooden platform upon which the compass may rest during the inspection. A 4 x 4 inch timber set firmly in the ground with a 6 x 6 inch board fastened to the top (at eye level) with wooden dowels will suffice. Nails (metal) must not be used in the platform.

(3) Establish an aiming stake 100 to 150 feet away in a direction coinciding with any one of the 5-degree-unit tick marks appearing on the compass dial. The exact location of the stake may be established by use of an aiming circle, an engineer transit or, in the absence of either of the first two, a compass selected from among several that appear to agree exactly.

(4) Trace the outline of the compass on the sighting platform so that each compass can thereafter be positioned quickly.

(5) A compass to be inspected is positioned and sighted on the aiming stake, and then the dial is read. If the compass is off in excess of two degrees, it should be turned in as defective and not issued to students.

c. Inspection for Night Clarity

(1) All compasses to be inspected should be opened and exposed to either natural or artificial light for 30 to 60 seconds prior to the inspection.

(2) After the inspector has adapted himself to darkness for one-half hour, the dial of each compass should be read, in darkness, through the eyepiece. Compasses which are read in this manner with great difficulty or not at all should be turned in and not issued to students.

(NOTE: Normal eyesight is essential, of course, if accurate decisions are to be made by the inspector. After learning to read the compass, students should be directed to present for inspection any compass that may be read only with great difficulty. Again the question of visual acuity versus the defective compass must be answered.)

SECTION I

PERIOD ONE: USE OF COMPASS

1. Description of Film Slides

C-1 - The Mission

Type ES. A 4" x 5" section of Fort Benning map, marked with starting point, "START." To the approximate northeast, 2000 meters from "START," is "OBJECTIVE." Starting point is marked with an X; objective is marked with a platoon symbol. ANGLE: Overhead.

C-2 - Equipment

Type BLCU. Five pieces of equipment laid out on a table:

1. Compass, lensatic, open position
2. Folded map
3. Route data card w/inscribed information
4. Pencil
5. Memory rope

ANGLE: 45° oblique

C-3 - Position of Compass

Type BLCU. Right hand shown holding compass in proper position. Cover is raised perpendicularly, eyepiece raised at an angle. (NOTE: Hand need not be completely in picture, main emphasis is on compass.) ANGLE: 90° to left of subject.

C-4 - Position of Cover at Night

Type BLCU. Exact picture as C-3, except with cover extended. A dark background is used to simulate night. ANGLE: 90° to left of subject.

C-5 - Position of the Hand

Type BLCU. Picture of hand holding compass - emphasis on hand, thumb through wire ring, index finger around front of the bowl. (NOTE: Compass should extend out of picture to emphasize hand.) ANGLE: 90° to left of subject.

C-6 - Position of the Free Hand

Type ELCU. Picture showing head of navigator holding compass in correct sighting position. Free hand steadying the compass is the main point. ANGLE: 45° to left-front of navigator.

C-7 - Eyepiece Placed Close to the Eye

Type ELCU. Picture showing navigator's head and hands, with eye close to eyepiece of compass (at center of photo). ANGLE: 90° to right side of subject.

C-8 - Focusing the Reading Glass

Type ELCU. Photo of navigator holding compass using free hand to focus eyepiece. Main point is the eyepiece and free hand adjusting. ANGLE: Slightly to rear of the 90° point to right of subject.

C-9 - Reducing Glare

Type ELCU. Photo of navigator holding compass using free hand to shade compass face. Main point is the free hand. ANGLE: Slightly to rear of the 90° point to right of subject.

C-10 - Keeping the Compass Level

Type ELCU. Photo showing front half of compass dial and bowl. Main emphasis on the position of the dial parallel to the rim of the cover glass. Dotted lines will be superimposed extending parallel from the dial and the rim. An arrow pointing from the rim to the dial shows the dial midway between the top and bottom of bowl. ANGLE: 45° oblique toward the front of compass. (NOTE: No shadow will appear in photo.)

C-11 - Drill: What's Wrong?

Type ELCU. Photo showing head and hands of navigator holding compass in correct position except the eyepiece is approximately 6 inches from the eye. Main point is the compass being held too far from eye. ANGLE: 90° to right of subject. Background: parallel lines of building siding. Choices are:

a. Eye too far from eyepiece

b. Compass not level

c. Compass backwards

d. Nothing is wrong

Answer: a.

C-12 - Drill: What's Wrong?

Type BLCU. Photo showing head and hands of navigator holding compass in correct position except the compass is obviously tilted forward. Main point is the compass not level. ANGLE: 90° to right of subject. Background: parallel lines of building siding. Choices are:

a. Eye too far from eyepiece

b. Compass not level

c. Compass backwards

d. Nothing is wrong

Answer: b.

C-13 - Drill: What's Wrong?

Type BLCU. Photo of front half of compass dial and bowl. Dial touching cover glass to show compass is not level. ANGLE: 45° oblique toward front of compass. (NOTE: No shadow will appear in photo.) Choices are:

a. Eye too far from eyepiece

b. Compass not level

c. Compass backwards

d. Nothing is wrong

Answer: b.

C-14 - Drill: What's Wrong?

Type BLCU. Photo showing head and hands of navigator in correct sighting position (nothing is wrong). ANGLE: 90° to right of subject. Background: parallel lines of building siding. Choices are:

a. Eye too far from eyepiece

b. Compass not level

c. Compass backwards

d. Nothing is wrong

Answer: d.

C-15 - Drill: What's Wrong?

Type BLCU. Photo of navigator holding compass in correct position except tilting it off to side. ANGLE: Head-on (navigator facing camera). Background: parallel lines of building siding. Choices are:

a. Eye too far from eyepiece

b. Compass not level

c. Compass backwards

d. Nothing is wrong

Answer: b.

C-16 - Drill: What's Wrong?

Type BLCU. Photo of front half of compass dial and bowl. Dial touching bottom of bowl to show compass is not level. ANGLE: 45° oblique toward front of compass. (NOTE: No shadow will appear in photo.) Choices are:

a. Eye too far from eyepiece

b. Compass not level

c. Compass backwards

d. Nothing is wrong

Answer: b.

C-17 - Drill: What's Wrong?

Type BLCU. Photo showing head and hands of navigator holding compass backwards with cover close to the eye. ANGLE: 90° to

right of subject. Background: parallel lines of building siding. Choices are:

a. Eye too far from eyepiece

b. Compass not level

c. Compass backwards

d. Nothing is wrong

Answer: c.

C-18 - Drill: What's Wrong?

Type ELCU. Photo of front half of compass dial and bowl. Dial touching cover glass on right side and bottom of bowl on left side, to show compass not level. ANGLE: 45° oblique toward front of compass. (NOTE: No shadow will appear in photo.) Choices are:

a. Eye too far from eyepiece

b. Compass not level

c. Compass backwards

d. Nothing is wrong

Answer: b.

C-19 - The Face of the Compass

Type ELCU. Photo showing entire compass dial, cover rotated so that yellow luminous lines are at the bottom of the photo. ANGLE: Directly overhead. (NOTE: No shadow will appear in photo.)

C-20 - The Luminous Area

Type ELCU. Photo of front half of compass dial and bowl showing the luminous area clearly under the dial. ANGLE: 45° oblique toward front of compass. (NOTE: No shadow will appear in photo.)

C-21 thru C-32 - Slide Drill in Reading

Type ELCU. Twelve photos of front half of compass dial with index directly over the following degrees:

C-21: 360° - Choices: (a) 90°, (b) 360°, (c) 64°, (d) 180°

Answer: (b)

C-22: 280° - Choices: (a) 280°, (b) 275°, (c) 285°, (d) 110°

Answer: (a)

C-23: 135° - Choices: (a) 130°, (b) 140°, (c) 135°, (d) 24°
Answer: (c)

C-24: 70° - Choices: (a) 65°, (b) 80°, (c) 75°, (d) 70°
Answer: (d)

C-25: 265° - Choices: (a) 270°, (b) 255°, (c) 265°, (d) 260°
Answer: (c)

C-26 330° - Choices: (a) 330°, (b) 320°, (c) 325°, (d) 335°
Answer: (a)

C-27: 45° - Choices: (a) 40°, (b) 45°, (c) 35°, (d) 90°
Answer: (b)

C-28: 120° - Choices: (a) 125°, (b) 21°, (c) 120°, (d) 115°
Answer: (c)

C-29: 230° - Choices: (a) 225°, (b) 230°, (c) 225°, (d) 41°
Answer: (b)

C-30: 295° - Choices: (a) 285°, (b) 295°, (c) 290°, (d) 300°
Answer: (b)

C-31: 150° - Choices: (a) 140°, (b) 155°, (c) 145°, (d) 150°
Answer: (d)

C-32: 215° - Choices: (a) 215°, (b) 38°, (c) 210°, (d) 220°
Answer: (a)

ANGLE: 45° oblique toward front of compass.

(NOTE: Extreme care should be taken that NO SHADOWS appear in these photos, C-21 thru C-32.)

C-33 - Locating an Assigned Azimuth

Type ELP. Photo with full shot of navigator in center of

photo holding compass in correct position. He is facing to the right. Three dotted lines will be superimposed extending from navigator's feet to 360°, 215°, and 155°. The degrees are written along the dotted lines. (360° is perpendicular to camera running off to the right.) ANGLE: Eye level shot.

C-34 - Navigator Rotates

Type ELP. Full shot of navigator in center of photo holding compass in correct position. He is facing along the 215° mark as prescribed in photo C-32. ANGLE: Eye level.

C-35 - Facing a New Assigned Azimuth

Type ELP. Full shot of navigator in center of photo holding compass in correct position. He is facing along the 155° mark as prescribed in photo C-32. (NOTE: In all these photos, C-32 thru C-34, horizon is in view.) ANGLE: Eye level.

C-36 - The Day Sighting

Type ELCU. Shot of navigator's head and hands holding compass in correct sighting position. A dotted line extends from his eye through the sight slot and the sight wire out to the right edge of the photograph. ANGLE: 90° to right of subject.

C-37 - The Night Sighting

Type ELCU. Shot of navigator's head and hands holding compass in correct sighting position. The cover is extended and a dotted line extends from his eye, over the sight slot and along the two luminous dots on the cover, out to the right edge of the photograph. Simulate darkness; white dots stand out plainly. ANGLE: Slightly behind a 90° point to right of subject and slightly above compass.

C-38 - Luminous Dots at Night

Type ELCU. Shot of compass with the cover extended for night use. A dotted line extends along the luminous dots out to a tree on the horizon. The effect is produced of looking over the compass eyepiece and sighting along the luminous dots. ANGLE: 45° oblique to rear of compass.

C-39 - Proper Use of Compass

Type ELCU. Shot of navigator's head and hands holding compass in correct sighting position. One dotted line extends from

his eye through the eyepiece to the dial, another extends from his eye through the sight slot and sight wire out to right edge of photo. ANGLE: 90° to right of subject.

C-40 - Sighting Along an Assigned Azimuth

Type ELCU. Shot taken 45° behind right of navigator, of his head and hands holding compass in correct sighting position. One dotted line extends from the bottom edge of photo (supposedly from navigator's feet) out to horizon. Along this line is written "300°." A lone pine tree sits right on this line not quite as far as horizon. Another dotted line extends from navigator's eye through the reading glass to the dial. A third line extends from his eye, through the sight slot and sight wire out to the pine tree. ANGLE: 45° behind the subject's right side. Backgrounds: Level cleared ground.

2. Description of Scorecards

a. The scorecard for the course, "Compass Sighting Course," Period One, consists of a 4 x 5 inch card printed on both sides. The card is printed or mimeographed first on a 5 x 8 inch unlined index card, on both sides, and then cut into two 4 x 5 inch cards, after the format shown in Figs 1 and 2.

b. The scorecard for the course, "Sighting Range," Period One, consists of a 4 x 5 inch card printed on one side. The card is printed or mimeographed first on a 5 x 8 inch unlined index card, then cut into two 4 x 5 inch cards, after the format shown in Fig 3.

Fig 1. Face of Scorecard for Compass Sighting Course," Period One. (NOTE: Shown here as double card, as it appears on stencil.)

Fig 2. Reverse side of Fig 1, Scorecard, Compass Sighting Course," Period One.

Fig 3. "Scorecard for Sighting Range," Period One.
(NOTE: Shown here as double card, as it appears on stencil.)

3. Tables of Missions

TABLE I

MISSIONS, COMPASS-SIGHTING COURSE, PERIOD ONE

Stakes of origin		First Student			Second Student			Third Student		
Start	From number	Sight at	Letter clue	Correct number	Sight at	Letter clue	Correct number	Sight at	Letter clue	Correct number
10°	38	165	W	43	215	DD	13			
	38	220	L	9	160	I	24			
	38	175	KK	44	190	Q	37			
20°	19	170	W	43	230	HH	36			
	19	225	L	9	175	FF	6			
	19	185	O	26	200	CC	8			
30°	1	185	W	43	235	III	36	175	W	43
	1	240	N	28	180	FF	6	245	Z	17
	1	195	EE	7	210	CC	8	200	Q	37
40°	21	190	KK	44	250	Z	17			
	21	245	N	28	195	O	26			
	21	205	Q	37	220	AA	18			
50°	2	205	EE	7	255	Z	17			
	2	200	JJ	12	200	O	26			
	2	215	CC	8	230	BB	32			

Stakes of origin		First Student			Second Student			Third Student		
Start	From number	Sight at	Letter clue	Correct number	Sight at	Letter clue	Correct number	Sight at	Letter clue	Correct number
60°	39	210	FF	7	270	T	31	205	O	26
	39	265	JJ	12	215	Q	37	275	M	29
	39	225	G	27	240	DD	13	230	AA	18
70°	3	225	CC	8	275	T	31			
	3	280	M	29	220	Q	37			
	3	235	AA	18	250	L	9			
80°	22	230	CC	8	290	S	11			
	22	285	M	29	235	G	29			
	22	245	BB	32	260	HH	36			
90°	41	245	AA	18	295	S	11	235	CC	8
	41	305	E	34	240	G	27	310	K	14
	41	255	I	13	270	N	28	260	L	9
100°	4	305	GG	16	255	BB	32			
	4	245	G	27	315	K	14			
	4	265	L	9	280	Z	17			
110°	23	325	D	33	255	AA	18			
	23	265	DD	13	315	E	34			
	23	275	HH	36	290	JJ	12			
120°	42	325	K	14	275	L	9	330	D	33
	42	265	BB	32	335	A	38	270	DD	13
	42	285	N	28	300	T	31	290	Z	17

Stakes of origin		First Student			Second Student			Third Student		
Start	From number	Sight at	Letter clue	Correct number	Sight at	Letter clue	Correct number	Sight at	Letter clue	Correct number
130°	24	345	J	19	275	DD	13			
	24	285	HH	36	335	D	33			
	24	295	Z	17	310	M	29			
140°	43	345	A	38	295	N	28			
	43	285	L	9	355	R	1			
	43	305	JJ	12	320	S	11			
150°	6	5	U	21	295	HH	36	360	R	1
	6	305	Z	17	355	J	19	300	N	28
	6	315	T	31	330	GG	16	320	M	29
160°	44	5	R	1	315	JJ	12			
	44	305	N	28	15	B	2			
	44	325	M	29	340	E	34			
170°	26	25	H	39	315	Z	17			
	26	325	T	31	15	U	21			
	26	335	S	11	350	K	14			
180°	7	25	B	2	335	M	29	30	R	39
	7	325	JJ	12	35	V	3	330	T	31
	7	345	G	16	360	D	33	350	E	34
190°	37	40	V	3	340	M	29			
	37	335	T	31	45	X	22			
	37	355	E	34	10	A	36			

Stokes of origin		First Student			Second Student			Third Student		
Start	From number	Sight at	Letter clue	Correct number	Sight at	Letter clue	Correct number	Sight at	Letter clue	Correct number
200°	8	55	C	41	345	M	29			
	8	350	S	11	50	X	22			
	8	5	K	14	20	J	19			
210°	27	60	C	41	5	E	34	55	X	22
	27	355	S	11	65	F	4	10	K	14
	27	15	D	33	30	R	1	20	A	38
220°	18	75	Y	23	5	00	16			
	18	10	E	34	70	F	4			
	18	25	A	38	40	U	21			
230°	32	80	Y	23	20	K	14			
	32	15	E	34	85	P	42			
	32	35	J	19	50	B	2			
240°	13	95	I	24	25	K	14	85	Y	23
	13	30	D	33	90	P	42	35	A	38
	13	45	R	1	60	U	39	50	U	21
250°	9	105	W	43	35	D	33			
	9	40	A	38	100	I	24			
	9	55	U	21	70	V	3			
260°	36	115	FF	6	45	A	38			
	36	50	J	19	110	W	43			
	36	65	B	2	80	X	22			

Stakes of origin		First Student			Second Student			Third Student		
Start	From number	Sight at	Letter clue	Correct number	Sight at	Letter clue	Correct number	Sight at	Letter clue	Correct number
270°	28	120	FF	6	60	R	1	115	W	43
	28	55	J	19	125	KK	44	65	U	21
	28	75	H	39	90	C	41	80	V	3
280°	17	70	U	21	130	KK	44			
	17	125	FF	6	75	B	2			
	17	35	V	3	100	F	4			
290°		85	H	39	135	KK	44			
		140	O	26	80	B	2			
		95	X	22	110	Y	23			
300°	31	90	H	39	150	EE	7	85	B	2
	31	145	O	26	95	V	3	155	Q	37
	31	105	C	41	120	P	42	110	F	4
310°	29	105	X	22	155	EE	7			
	29	160	Q	37	100	V	3			
	29	115	F	4	130	I	24			
320°	11	110	X	22	170	CC	8			
	11	165	Q	37	115	C	41			
	11	125	Y	23	140	W	43			
330°	16	125	F	4	175	CC	8	115	X	22
	16	130	G	27	120	C	41	185	AA	18
	16	135	P	42	150	FF	6	140	I	24

Stakes of origin		First Student			Second Student			Third Student		
Start	From number	Sight at	Letter clue	Correct number	Sight at	Letter clue	Correct number	Sight at	Letter clue	Correct number
340°	34	130	P	4	190	AA	18			
	34	185	G	27	135	Y	23			
	34	145	I	24	160	KK	44			
350°	14	145	P	42	195	AA	18			
	14	205	DD	13	140	Y	23			
	14	155	W	43	170	O	26			
360°	33	150	P	42	210	DD	13	145	Y	23
	33	205	BB	32	155	I	24	215	L	9
	33	165	FF	6	160	EE	7	170	KK	44

(NOTE: The missions for the second three sightings at any stake are the same as the missions assigned to that stake for the first three sightings.)

TABLE II

MISSIONS, SIGHTING RANGE, PERIOD ONE

STAKE GROUP 1-5

From number	Sight to	Correct degrees
1	A	275
	D	290
	G	300
2	A	275
	D	290
	G	300
3	B	275
	E	290
	H	300
4	C	275
	F	290
	I	300
5	C	275
	F	290
	I	300

STAKE GROUP 6-10

6	D	285
	G	295
	J	305
7	D	285
	G	295
	J	305
8	E	285
	H	295
	K	305
9	F	285
	I	295
	L	305
10	F	285
	I	295
	L	305

STAKE GROUP 11-15

From number	Sight to	Correct degrees
11	G	290
	J	300
	M	315
12	G	290
	J	300
	M	315
13	H	290
	K	300
	N	315
14	I	290
	L	300
	O	315
15	I	290
	L	300
	O	315

(Note: The missions for each stake group appear on a separate sheet of bond paper to be attached to the key panels behind the student stakes, for easy reference by the students.)

4. Answer Sheets

PERIOD ONE

ANSWER SHEET
SLIDE DRILL # IN # HOLDING

Student's Name (Print) _____ (Last) _____ (First)

SCORE: (Total number wrong) [ ]

(Slide Number)	(Possible Choices)			
C-11	a	b	c	d
C-12	a	b	c	d
C-13	a	b	c	d
C-14	a	b	c	d
C-15	a	b	c	d

Fig 4. "Typical Answer Sheet," Period One. Based upon this format, Answer Sheets bearing the slide numbers of all drill questions may be produced.

SECTION II

PERIOD TWO: DEAD RECKONING

1. Description of Charts, Steering Marks

Chart S-1

Title: "Steering Marks." The following words will appear on the chart: "The best steering mark is: (1) the most distinct, (2) far, (3) high, and (4) within the distance to be travelled."

Chart S-2

Title: "Possible Steering Marks." The background contains rolling hills. Atop one of the hills is a red and white "Fort Benning type" water tower. Silhouetted against the hills is a thick pine woodline. From the left, about 3/4 across, the woods are broken up by a clearing containing a lone tree and a boulder. The woodline continues to the right from the clearing. Several trees extend above the tops of the rest of the trees. The foreground is a clear area with weeds, bushes, one fallen pine, small tree sprouts. Directly under the water tower, one pine will extend above the general tree top level. One high, distinct pine is in front of bare dead tree. (NOTE: Written description of features appearing in the figure will not appear on charts.)

Chart S-3

Title: "The Far Steering Mark." Bottom left corner shows navigator's head and hands holding compass. Dotted line extends from his eye through sight slot and sight wire out to a tall bare tree almost on the horizon. A second dotted line extends from the bottom of the picture, supposedly from the navigator's feet, out to the base of the tree and past the tree to the horizon. Along this line are three other objects, a small bush, a small tree, and a big rock. Background partly clouded sky. Foreground contains a few weeds, fallen limbs, etc.

Chart S-4

Title: "Selection of Steering Marks at Night." Silhouette of navigator, head and shoulders against skyline near the left edge of the scene. The navigator is sighting (dotted line) to a tall tree clearly outlined against the skyline.

Mock-up of Compass:

Cardboard cut-out of compass cover, 20" high, 17" wide, CD color, with cut-out sight wire aperture. A piece of black wire will represent the sight wire. Wire hangers will be attached to top of mock-up.

2. Description of Charts, Distance

Chart D-1

Title: "Conditions Which Shorten Normal Pace." The following words appear:

"A. When walking is difficult

1. Heavy underbrush, sand, gravel, mud.

2. Strong headwind, snow, rain, ice.

3. Heavy clothing and shoes.

4. Uphill.

B. When seeing is difficult

1. Night.

2. Fog, smoke.

C. When tired"

Chart D-2

Title: "The Detour." Chart showing small swamp - lower portion of chart is a compass. Arrow extends in box-shaped route around swamp to a pine tree on opposite side. Dotted line extends from compass across swamp to pine tree. Rolling hills in background.

Chart D-3

Title: "Using a Steering Mark, Count Forward Steps Only." Same as Chart D-2, except footsteps replace arrows around swamp. Footsteps in forward direction are blackened and numbered consecutively. Sidesteps are in outline.

Chart D-4

Title: "Absence of Steering Marks." Green patch extends from

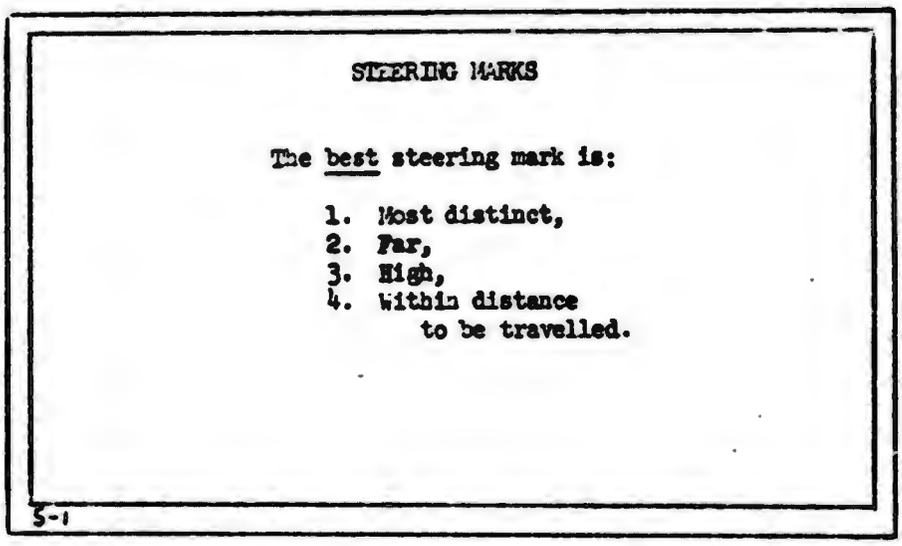


Fig 5. Chart S-1, "Steering Marks," Period Two

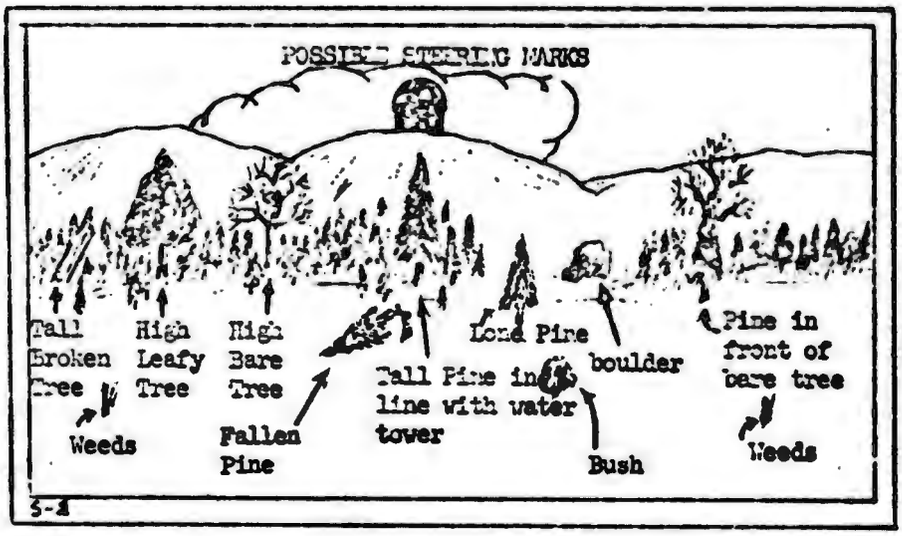


Fig 6. Chart S-2, "Possible Steering Marks," Period Two

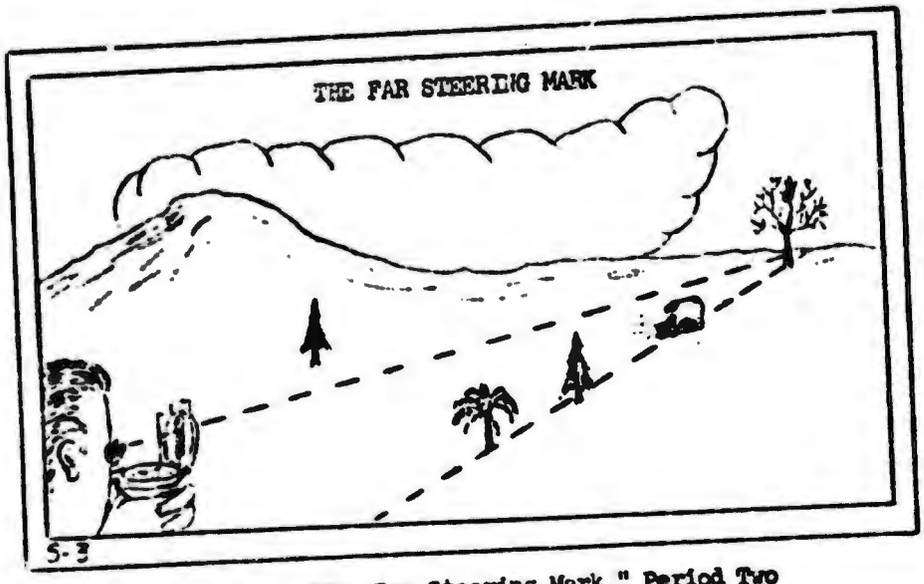


Fig 7. Chart S-3, "The Far Steering Mark," Period Two

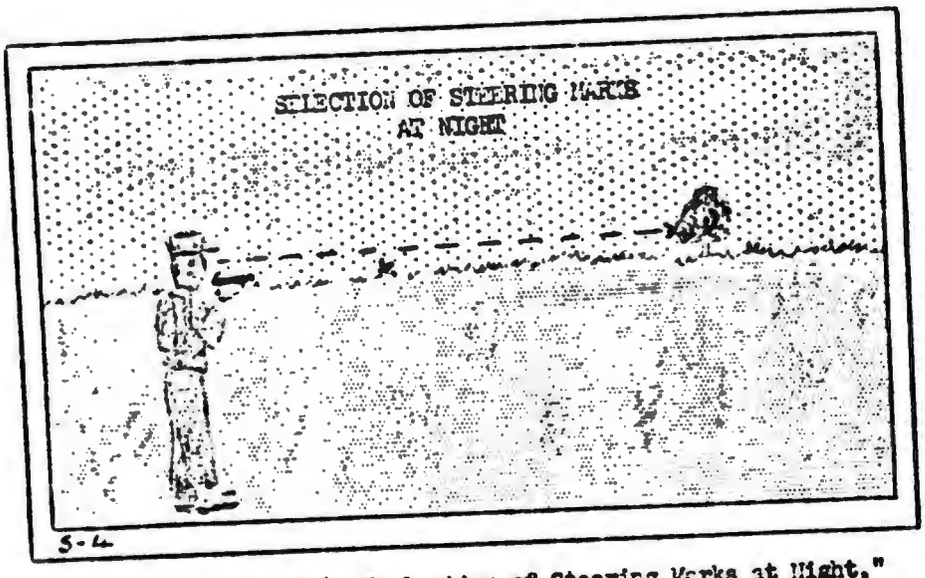


Fig 8. Chart S-4, "Selection of Steering Marks at Night," Period Two

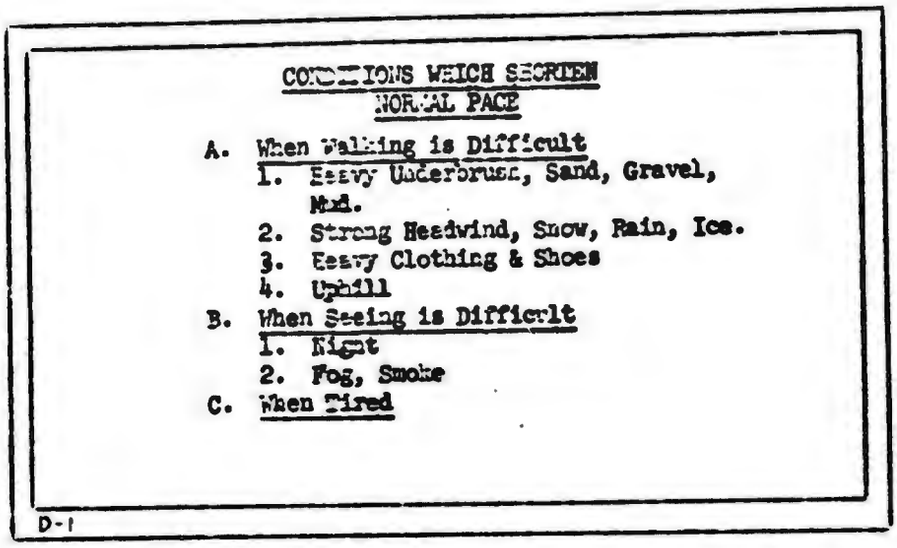


Fig 9. Chart D-1, "Conditions Which Shorten Normal Pace," Period Two

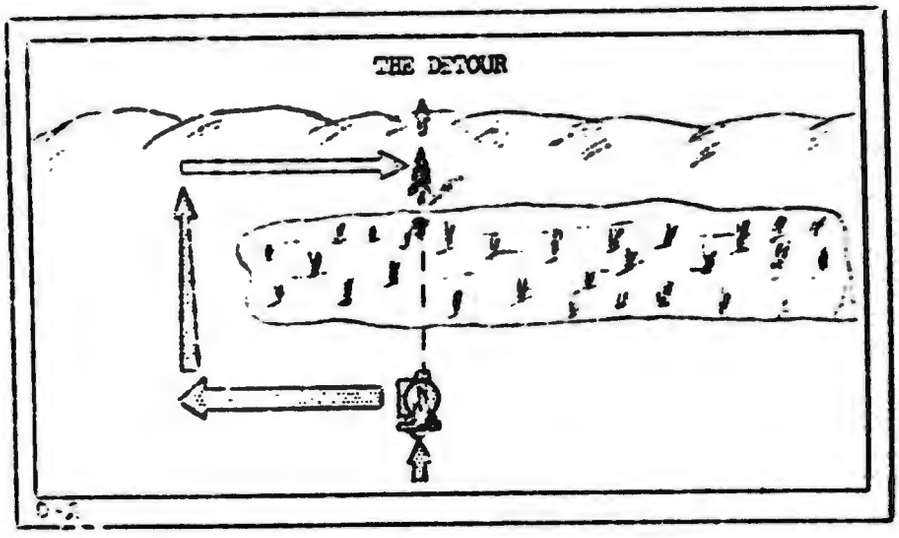


Fig 10. Chart D-2, "The Detour," Period Two

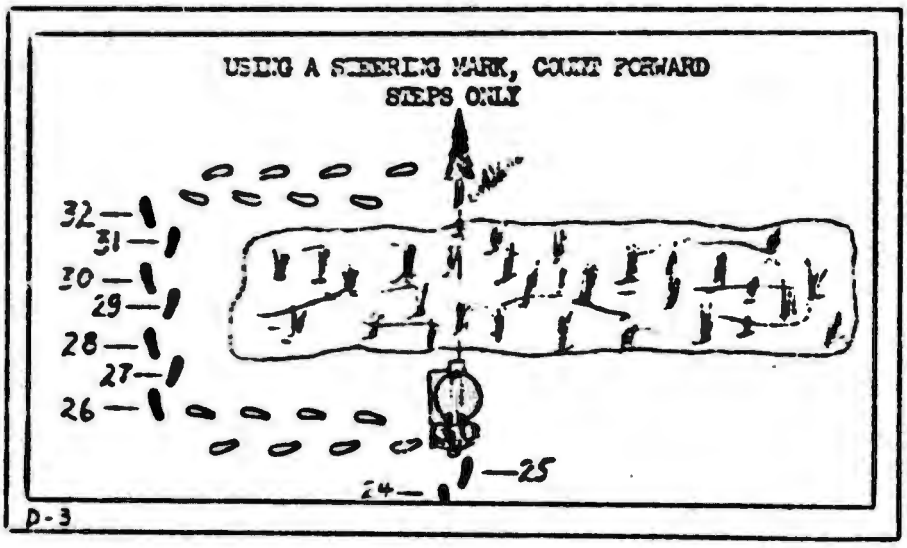


Fig 11. Chart D-3, "Using a Steering Mark, Count Forward Steps Only," Period Two

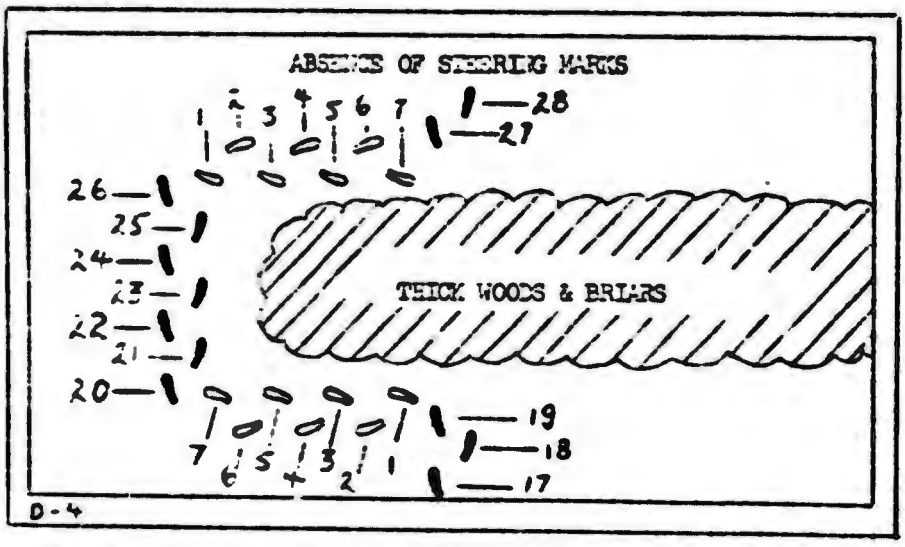


Fig 12. Chart D-4, "Absence of Steering Marks," Period Two

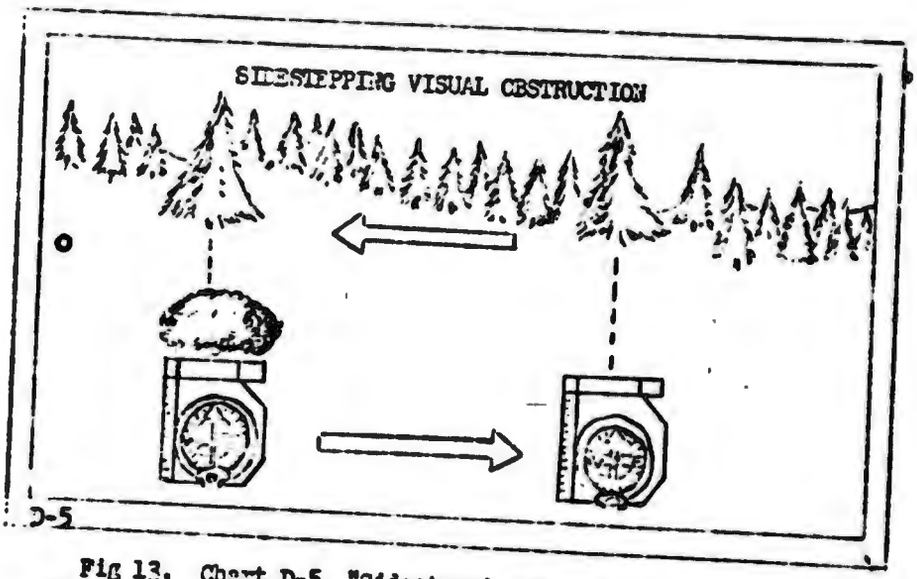


Fig 13. Chart D-5, "Sidestepping Visual Obstruction," Period Two

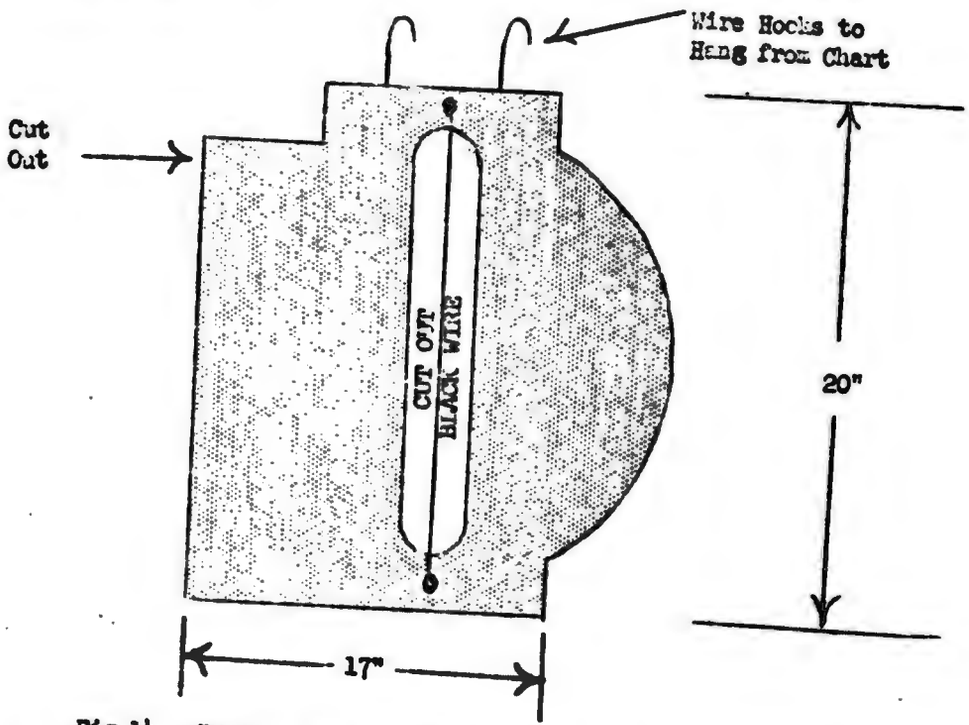


Fig 14. "Mock-Up of Compass Cover" To Be Made of Cardboard (O.D. Colored), Period Two.

right edge of chart, 3/4 way to left side, labelled "Thick woods and briars." Footsteps follow a box-shaped route around this patch to other side. Forward steps are blackened and numbered consecutively, 17 through 28. Sidesteps are outlined and numbered separately 1 through 7 and again 1 through 7 on the top.

Chart D-5

Title: "Sidestepping a Visual Obstruction." Overhead view of two open compasses side by side on bottom edge of chart. Dotted lines extend from each and run parallel out to two prominent steering marks on a woodline. In front of the right hand compass is a heavy bush. A wide arrow extends from the left hand compass pointing to the right hand compass, and at the woodline, a similar arrow extends from the right hand steering mark to the left hand steering mark. (NOTE: Prefixes S- and D- stand for Steering Marks and Distance, respectively, for purposes of identification.)

3. Description of Scorecards

a. The scorecard for the course, "Maintaining Direction While Moving," consists of a 4x5 inch card printed on one side. The card is printed or mimeographed first on a 5x8 inch unlined index card, and then cut into two 4x5 inch cards, after the format shown in fig 16.

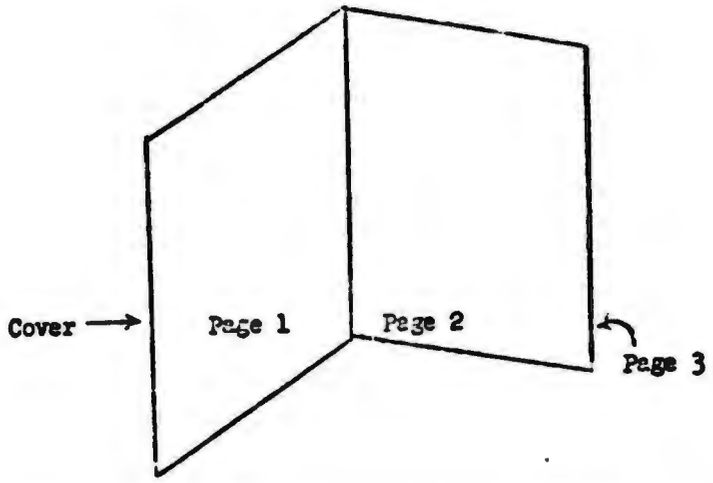


Fig 15. General sketch of scorecard for courses, "Applying the Standard," "Detouring," and "Dead Reckoning." The format for each of the four individual pages is shown in figs 18 and 19.

Fig 16. "Scorecard, Maintaining Direction While Moving," Period Two. (Note: Shown here as a double card, as it appears on stencil.)

b. The scorecard for the course, "Determining the Individual Standard" consists of a wallet-size (2-1/2" x 3-3/4") unlined card. The card is printed or mimeographed after the format shown in fig 17.

c. The scorecards for the courses, "Applying the Standard," "Detouring," and "Dead Reckoning" consist of a 5x8 inch unlined index card folded in the center to form a 4x5 inch booklet of four pages. Prior to folding, the cards are printed or mimeographed after the format shown in figs 18 and 19.

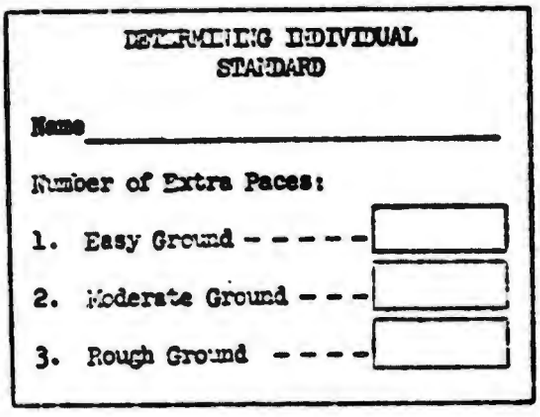


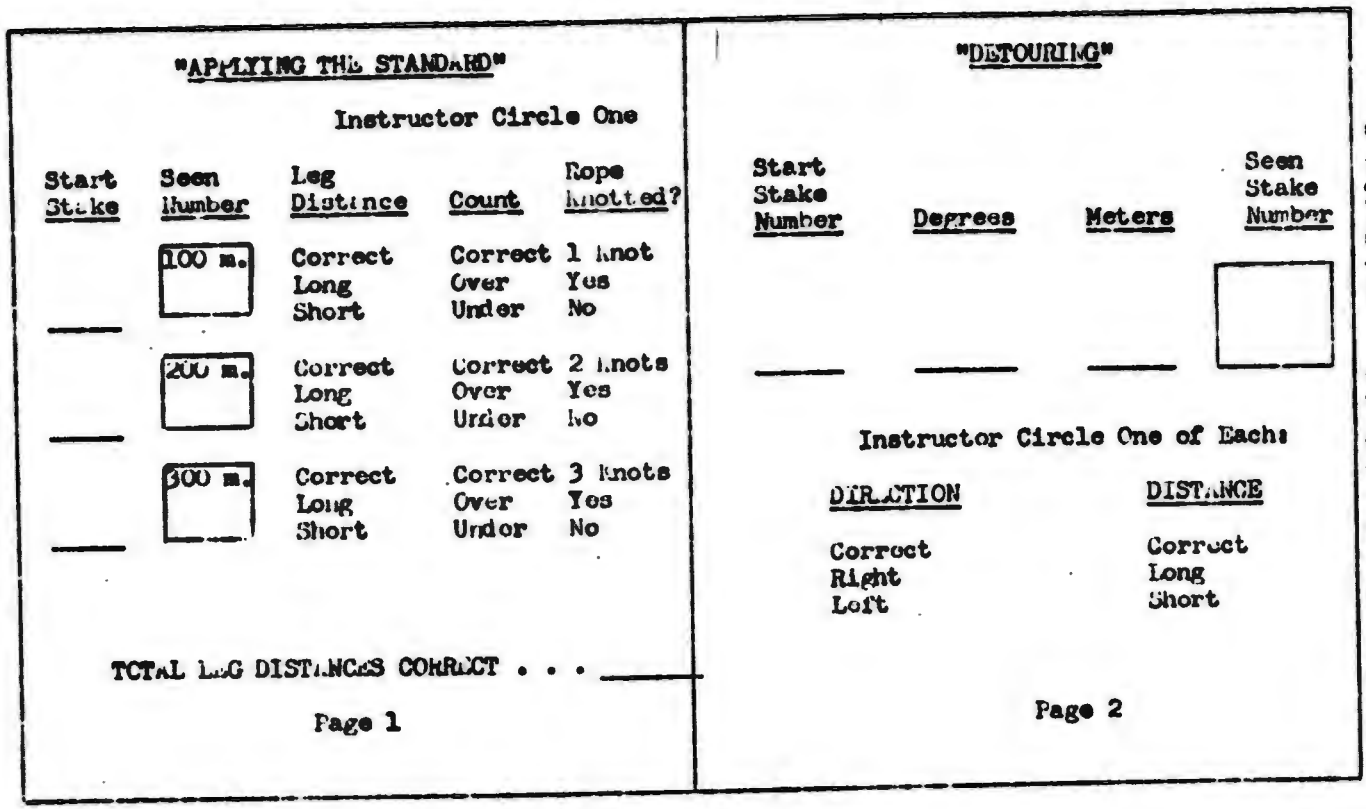
Fig 17. Wallet-size Scorecard for "Determining the Individual Standard," Period Two

4. Scoring Keys, Courses, "Applying the Standard," "Detouring," and "Dead Reckoning," Period Two

a. Format and content of the three Scoring Keys for the cited courses appear in figs 21, 22, 23, 24, 25. The Scoring Keys are first employed in assigning missions by entering a start stake number in the scorecards (fig 18 and 19) issued to each student at the beginning of the period. Each AI on the cited courses will require a copy of the Scoring Keys to permit him to make corrections.

b. Entry of Initial Mission in Scorecards

Examination of the Scoring Keys indicates a total of five numbered START STAKES for the courses concerned. However, the three START STAKES to be entered in course, "Applying the Standard," will be entered by the student on the courses upon instruction from the AI. The remaining two numbered START STAKES will be entered in



"APPLYING THE STANDARD"

Instructor Circle One

Start Stake	Seen Number	Leg Distance	Count	Rope Knotted?
____	100 m.	Correct Long Short	Correct 1 Knot Over Under	Yes No
____	200 m.	Correct Long Short	Correct 2 Knots Over Under	Yes No
____	300 m.	Correct Long Short	Correct 3 Knots Over Under	Yes No

TOTAL LEG DISTANCES CORRECT . . . _____

Page 1

"DETOURING"

Start Stake Number	Degrees	Meters	Seen Stake Number
_____	_____	_____	

Instructor Circle One of Each:

DIRECTION	DISTANCE
Correct	Correct
Right	Long
Left	Short

Page 2

Fig. 18. "Page 1 and 2 of Scorecard Booklet," Period Two.

"DEAD RECKONING"

Start Stake Number	Degrees	Meters	Seen Stake Number
____	____	____	

Instructor Circle One of Each:

DIRECTION	DISTANCE
Correct	Correct
Right	Long
Left	Short

Page 3

PRINT NAME _____

SCORECARD

PERIOD TWO

LAND NAVIGATION

COURSES:

"Applying the Standard"

"Detouring"

"Dead Reckoning"

Fig 19. "Page 3 and Cover of Scorecard Booklet," Period Two.

advance. For these, the total number of students are simply assigned in equal numbers to the START STAKES available for that particular course. (NOTE: For the "Dead Reckoning" course, start stake number should also indicate a left or right mission. See detailed diagram of "Dead Reckoning" course, fig 55, App III, Sec II. Example: Start Stake 03L.)

5. Specific Instructions Regarding Use of Scoring Keys, Period Two

a. Course, "Determining the Individual Standard"

The AI stationed at the terminal end of each of the three lanes will require a copy of the Conversion Table (fig 20). As students report to him the number of paces they took in traveling the lane, he checks his table and gives them the number of extra paces they require per 25 meters, instructing them to write that number in the appropriate box on their scorecard.

b. Course, "Applying the Standard"

The AI stationed at the start of each 100 meter mark on the lane will require a copy of Scoring Key, "Applying the Standard." The AI at the start stakes will equally distribute students along the four start stakes as they filter off the first course, telling them to write the number of the stake from which they start in the appropriate space on their scorecard. AI's at the 100, 200, and 300 meter marks along the lane will correct each student's scorecard as he reports to them. They will check the student's distance, count, memory rope, correct this on each scorecard, and quickly brief the man on his mistake. They will then assign him to his next start stake as indicated on the Scoring Key.

c. Course, "Detouring"

Each AI stationed along the perimeter of the outer "B" circle will require a copy of the Scoring Key, "Detouring." As students complete the course and report to the AI, the AI will check them for correctness on both distance and direction by examining the schematic diagram on the back of the Scoring Key. He will then circle the appropriate alternatives under "Direction" and "Distance" on students' scorecards

d. Course, "Dead Reckoning"

Each AI stationed at the pegboard objective area will require a copy of Scoring Key, "Dead Reckoning." As students complete the course and report to the AI, the AI will check them for

SCORING KEY
"DETERMINING THE INDIVIDUAL STANDARD"
CONVERSION TABLE

Number of Paces for 100 Meters	Number of EXTRA paces for 25 Meters
100-104	1
105-108	2
109-112	3
113-116	4
117-120	5
121-124	6
125-128	7
129-132	8
133-136	9
137-140	10
141-144	11
145-148	12
149-152	13
153-156	14
157-160	15
161-164	16
165-168	17
169-172	18

Fig 20. "Scoring Key, Conversion Table, Determining the Individual Standard," Period Two.

SCORING KEY
"APPLYING THE STANDARD"

Start Stake	Correct seen Number	Next Start
1	6	6
2	7	7
3	8	8
4	9	9
6	12	12
7	13	13
8	14	14
9	15	15
12	18	--
13	19	--
14	20	--
15	21	--

Fig 21. "Scoring Key, Applying the Standard," Period Two.

SCORING KEY, DETOURING, PERIOD TWO
(First Quadrant)

START Stake		OBJECTIVES
Twelve	12-1	C-33
	12-2	D-33
	12-3	B-33
	12-4	C-34
	12-5	D-34
	12-6	B-34
	12-7	C-35
One	1-1	C-36
	1-2	D-36
	1-3	B-36
	1-4	C-1
	1-5	D-1
	1-6	B-1
	1-7	C-2
Two	2-1	C-3
	2-2	D-3
	2-3	B-3
	2-4	C-4
	2-5	D-4
	2-6	B-4
	2-7	C-5
Three	3-1	C-6
	3-2	D-6
	3-3	B-6
	3-4	C-7
	3-5	D-7
	3-6	B-7
	3-7	C-8
Four	4-1	C-9
	4-2	D-9
	4-3	B-9
	4-4	C-10
	4-5	D-10
	4-6	B-10
	4-7	C-11

Fig 22. "Sample face of Scoring Key, First Quadrant, Detouring," Period Two.

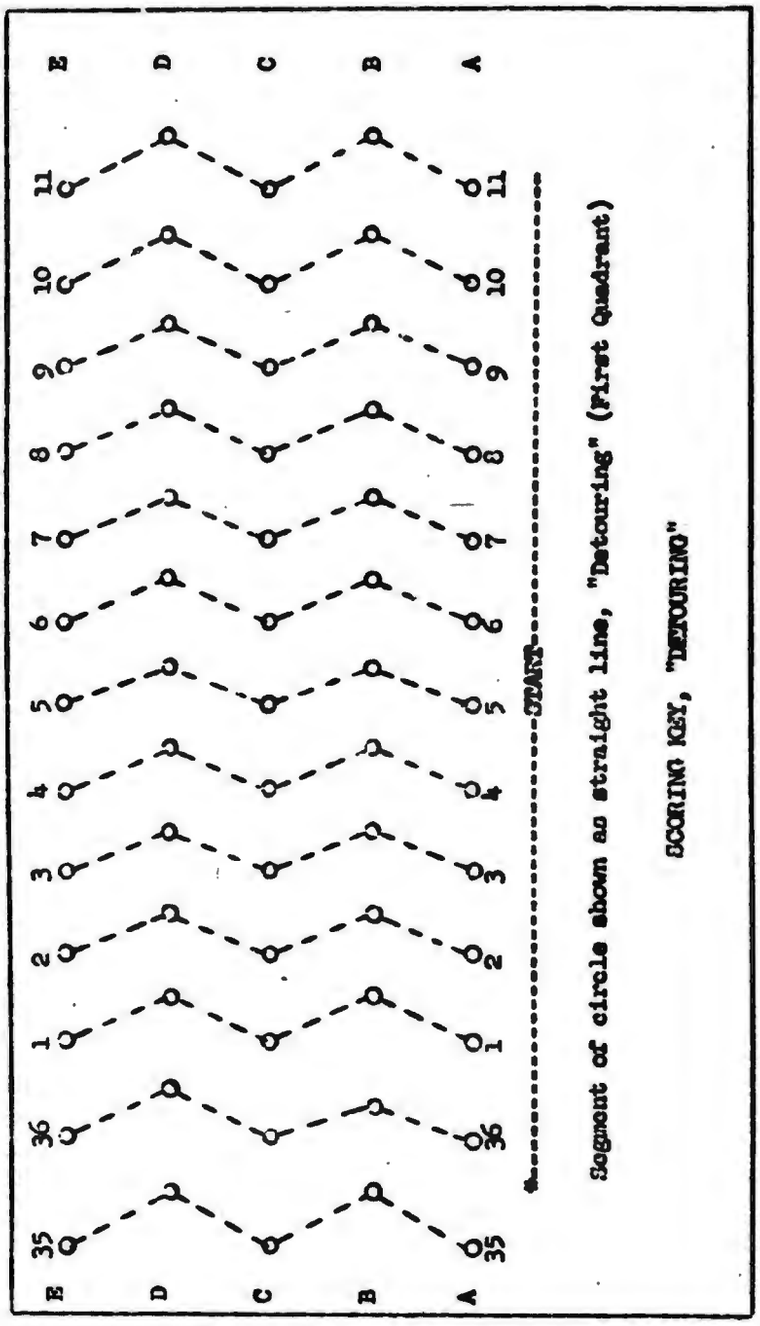


Fig 23. "Sample Reverse side of Fig 22, Schematic Diagram of First Quadrant of Circle, represented as a straight line, Detouring," Period Two.

SCORING KEY, "DEAD RECKONING"

Start Stake	OBJECTIVES Left	Right
D-2	C-7	E-7
D-3	C-6	E-6
D-4	C-5	E-5
D-5	C-4	E-4
D-6	C-3	E-3
E-2	D-7	F-7
E-3	D-6	F-6
E-4	D-5	F-5
E-5	D-4	F-4
E-6	D-3	F-3
H-2	G-7	I-7
H-3	G-6	I-6
H-4	G-5	I-5
H-5	G-4	I-4
H-6	G-3	I-3
I-2	H-7	J-7
I-3	H-6	J-6
I-4	H-5	J-5
I-5	H-4	J-4
I-6	H-3	J-3

(NOTE: Score as correct all stakes which immediately surround objectives. For example, for objective C-7, all bordering stakes: B-6, B-7, B-8, C-6, C-8, D-6, D-7, D-8, would be scored as correct.

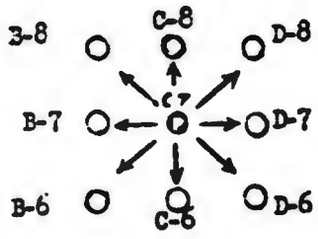


Fig 24. "Face of Scoring Key, Dead Reckoning," Period Two.

Fig 25. Reverse side of Fig 24, Schematic Diagram of Pegboard Area, Dead Reckoning, Period Two.

correctness on both distance and direction by examining the schematic diagram on the back of the Scoring Key. The Scoring Key lists the true objectives for each start stake. The AI will score as correct all stakes which immediately surround the true objective stake, in other words, any stake next to the true objective stake in any direction is scored as correct. The schematic diagram on the reverse side of the Scoring Key represents both north and south pegboard areas.

6. Tables of Missions

TABLE III

MISSIONS, MAINTAINING DIRECTION WHILE MOVING, PERIOD TWO

FIRST STUDENT

From Number	Sight at	Objective
1	100	I-42
2	20	B-43
3	120	K-27
4	40	D-9
5	140	M-11
6	60	F-6
7	160	O-8
8	80	E-22
9	180	Q-24
10	100	J-39
11	200	S-2
12	120	L-19
13	220	U-4
14	140	N-3
15	240	W-44
16	160	P-16
17	260	Y-7
18	180	R-32
19	280	AA-41
20	200	T-36
21	300	CC-12
22	220	V-34
23	320	EE-18
24	240	X-28
25	340	GG-23
26	260	Z-38
27	360	JJ-13
28	280	BB-31

TABLE III (continued)

MISSIONS, MAINTAINING DIRECTION WHILE MOVING, PERIOD TWO

FIRST STUDENT

From Number	Sight at	Objective
29	20	A-33
30	300	DD-29
31	40	C-17
32	320	FF-21
33	60	E-1
34	340	HH-26
35	80	G-14
36	360	KK-37

SECOND STUDENT

1	335	HH-26
2	90	H-22
3	355	KK-37
4	110	J-39
5	15	B-43
6	130	L-19
7	35	D-9
8	150	N-3
9	55	F-6
10	170	P-16
11	75	H-22
12	190	R-32
13	95	J-39
14	210	T-36
15	115	L-19
16	230	V-34
17	135	N-3
18	250	X-28
19	155	P-16
20	260	Z-38
21	175	R-32
22	290	BB-31
23	195	T-36
24	310	DD-29
25	215	V-34
26	330	FF-21
27	235	X-28
28	350	HH-26

TABLE III (continued)

MISSIONS, MAINTAINING DIRECTION WHILE MOVING, PERIOD TWO

SECOND STUDENT

From Number	Sight at	Objective
29	255	Z-38
30	10	KK-37
31	275	BB-31
32	30	B-43
33	295	DD-29
34	50	D-9
35	315	FF-21
36	70	F-6

THIRD STUDENT

6	150	E-3
12	85	I-42
18	145	C-8
24	205	U-4
30	265	AA-41
36	325	GG-23

TABLE IV

MISSIONS, DETOURING, PERIOD TWO

START STAKE		DEGREES	STEPS	OBJECTIVE
One	1-1	350	55	C-36
	1-2	355	65	D-36
	1-3	355	45	B-36
	1-4	360	55	C-1
	1-5	5	45	D-1
	1-6	5	65	B-1
	1-7	10	55	C-2
Two	2-1	20	55	C-3
	2-2	25	65	D-3
	2-3	25	45	B-3
	2-4	30	55	C-4
	2-5	35	45	D-4
	2-6	35	65	B-4
	2-7	40	55	C-5

TABLE IV (continued)

MISSIONS, DETOURING, PERIOD TWO

START STATE		DEGREES	METERS	OBJECTIVE
Three	3-1	50		
	3-2	55	55	C-6
	3-3	55	65	D-6
	3-4	60	45	B-6
	3-5	65	55	C-7
	3-6	65	45	D-7
	3-7	70	65	B-7
			55	C-8
Four	4-1	80		
	4-2	85	55	C-9
	4-3	85	65	D-9
	4-4	90	45	B-9
	4-5	95	55	C-10
	4-6	95	45	D-10
	4-7	100	65	B-10
			55	C-11
Five	5-1	110		
	5-2	115	55	C-12
	5-3	115	65	D-12
	5-4	120	45	B-12
	5-5	125	55	C-13
	5-6	125	45	D-13
	5-7	130	65	B-13
			55	C-14
Six	6-1	140		
	6-2	145	55	C-15
	6-3	145	65	D-15
	6-4	150	45	B-15
	6-5	155	55	C-16
	6-6	155	45	D-16
	6-7	160	65	B-16
			55	C-17
Seven	7-1	170		
	7-2	175	55	C-18
	7-3	175	65	D-18
	7-4	180	45	B-18
	7-5	185	55	C-19
	7-6	185	45	D-19
	7-7	190	65	B-19
			55	C-20

TABLE IV (continued)

MISSIONS, DETOURING, PERIOD TWO

START STAKE		DEGREES	METERS	OBJECTIVE
Eight	8-1	200	55	C-21
	8-2	205	65	D-21
	8-3	205	45	B-21
	8-4	210	55	C-22
	8-5	215	45	D-22
	8-6	215	65	B-22
	8-7	220	55	C-23
Nine	9-1	230	55	C-24
	9-2	235	65	D-24
	9-3	235	45	B-24
	9-4	240	55	C-25
	9-5	245	45	D-25
	9-6	245	65	B-25
	9-7	250	55	C-26
Ten	10-1	260	55	C-27
	10-2	265	65	D-27
	10-3	265	45	B-27
	10-4	270	55	C-28
	10-5	275	45	D-28
	10-6	275	65	B-28
	10-7	280	55	C-29
Eleven	11-1	290	55	C-30
	11-2	295	65	D-30
	11-3	295	45	B-30
	11-4	300	55	C-31
	11-5	305	45	D-31
	11-6	305	65	B-31
	11-7	310	55	C-32
Twelve	12-1	320	55	C-33
	12-2	325	65	D-33
	12-3	325	45	B-33
	12-4	330	55	C-34
	12-5	335	45	D-34
	12-6	335	65	B-34
	12-7	340	55	C-35

TABLE V

MISSIONS, DEAD RECKONING, PERIOD TWO

SOUTH START STAKE		DEGREES	METERS	OBJECTIVES
LEFT	D-2	355	100	6, 7, 8 of B, C, D
	D-3	355	100	5, 6, 7 of B, C, D
	D-4	355	100	4, 5, 6 of B, C, D
	D-5	355	100	3, 4, 5 of B, C, D
	D-6	355	100	2, 3, 4 of B, C, D
RIGHT	D-2	5	100	6, 7, 8 of D, E, F
	D-3	5	100	5, 6, 7 of D, E, F
	D-4	5	100	4, 5, 6 of D, E, F
	D-5	5	100	3, 4, 5 of D, E, F
	D-6	5	100	2, 3, 4 of D, E, F
LEFT	E-2	355	100	6, 7, 8 of C, D, E
	E-3	355	100	5, 6, 7 of C, D, E
	E-4	355	100	4, 5, 6 of C, D, E
	E-5	355	100	3, 4, 5 of C, D, E
	E-6	355	100	2, 3, 4 of C, D, E
RIGHT	E-2	5	100	6, 7, 8 of E, F, G
	E-3	5	100	5, 6, 7 of E, F, G
	E-4	5	100	4, 5, 6 of E, F, G
	E-5	5	100	3, 4, 5 of E, F, G
	E-6	5	100	2, 3, 4 of E, F, G
LEFT	H-2	355	100	6, 7, 8 of F, G, H
	H-3	355	100	5, 6, 7 of F, G, H
	H-4	355	100	4, 5, 6 of F, G, H
	H-5	355	100	3, 4, 5 of F, G, H
	H-6	355	100	2, 3, 4 of F, G, H
RIGHT	H-2	5	100	6, 7, 8 of H, I, J
	H-3	5	100	5, 6, 7 of H, I, J
	H-4	5	100	4, 5, 6 of H, I, J
	H-5	5	100	3, 4, 5 of H, I, J
	H-6	5	100	2, 3, 4 of H, I, J
LEFT	I-2	355	100	6, 7, 8 of G, H, I
	I-3	355	100	5, 6, 7 of G, H, I
	I-4	355	100	4, 5, 6 of G, H, I
	I-5	355	100	3, 4, 5 of G, H, I
	I-6	355	100	2, 3, 4 of G, H, I

TABLE V (continued)

MISSIONS, DEAD RECKONING, PERIOD TWO

SOUTH

START STATE		DEGREES	METERS	OBJECTIVES
RIGHT	I-2	5	100	6, 7, 8 of I, J, K
	I-3	5	100	5, 6, 7 of I, J, K
	I-4	5	100	4, 5, 6 of I, J, K
	I-5	5	100	3, 4, 5 of I, J, K
	I-6	5	100	2, 3, 4 of I, J, K

NORTH

START STATE				
LEFT	D-2	175	100	6, 7, 8 of B, C, D
	D-3	175	100	5, 6, 7 of B, C, D
	D-4	175	100	4, 5, 6 of B, C, D
	D-5	175	100	3, 4, 5 of B, C, D
	D-6	175	100	2, 3, 4 of B, C, D
RIGHT	D-2	185	100	6, 7, 8 of D, E, F
	D-3	185	100	5, 6, 7 of D, E, F
	D-4	185	100	4, 5, 6 of D, E, F
	D-5	185	100	3, 4, 5 of D, E, F
	D-6	185	100	2, 3, 4 of D, E, F
LEFT	E-2	175	100	6, 7, 8 of C, D, E
	E-3	175	100	5, 6, 7 of C, D, E
	E-4	175	100	4, 5, 6 of C, D, E
	E-5	175	100	3, 4, 5 of C, D, E
	E-6	175	100	2, 3, 4 of C, D, E
RIGHT	E-2	185	100	6, 7, 8 of E, F, G
	E-3	185	100	5, 6, 7 of E, F, G
	E-4	185	100	4, 5, 6 of E, F, G
	E-5	185	100	3, 4, 5 of E, F, G
	E-6	185	100	2, 3, 4 of E, F, G
LEFT	H-2	175	100	6, 7, 8 of F, G, H
	H-3	175	100	5, 6, 7 of F, G, H
	H-4	175	100	4, 5, 6 of F, G, H
	H-5	175	100	3, 4, 5 of F, G, H
	H-6	175	100	2, 3, 4 of F, G, H

TABLE V (continued)

MISSIONS, DEAD RECKONING, PERIOD TWO

NORTH START STAKE		DEGREES	METERS	OBJECTIVES
RIGHT	H-2	185	100	6, 7, 8 of H, I, J
	H-3	185	100	5, 6, 7 of H, I, J
	H-4	185	100	4, 5, 6 of H, I, J
	H-5	185	100	3, 4, 5 of H, I, J
	H-6	185	100	2, 3, 4 of H, I, J
LEFT	I-2	175	100	6, 7, 8 of G, H, I
	I-3	175	100	5, 6, 7 of G, H, I
	I-4	175	100	4, 5, 6 of G, H, I
	I-5	175	100	3, 4, 5 of G, H, I
	I-6	175	100	2, 3, 4 of G, H, I
RIGHT	I-2	185	100	6, 7, 8 of I, J, K
	I-3	185	100	5, 6, 7 of I, J, K
	I-4	185	100	4, 5, 6 of I, J, K
	I-5	185	100	3, 4, 5 of I, J, K
	I-6	185	100	2, 3, 4 of I, J, K

SECTION III

PERIOD THREE: MAP USING

Description of Film Slides

M-1 - The Checkpoint in Early and Later Training

Type LPC. Split screen, top and bottom. Top half shows student approaching numbered panel. Bottom shows student approaching crossroad.

M-2 - The Map

Type CS. Mock-up of entire map with all border information; however, map itself only measures approximately 3000 x 6000m. The "P" and the scale at the top are enlarged to insure good visibility. An "X" labeled START and an "O" labeled OBJECTIVE will appear on the map. (This mock-up will be used in M-1 through M-5.)

M-3 - Terrain Features vs. Map Symbols

Type CS. Split screen, side by side. On left is diagrammatic sketch of a map of the area shown realistically on the right. The area has a woodline on right, an improved road and highway cross in the center, a hill is upper left, pond with an intermittent and regular stream feeding it is in center. Houses are on stream and in open area. The road and stream cross the woodline and the stream crosses the road.

M-4 - Contour Indicates Slope

Type CS. Three views of a ground form model with contour lines and shading to enhance form: overhead, oblique, and side. See FM 21-16, fig 13 for reference. One side slopes steeply while the other has a quite gentle slope. Contours in brown.

M-5 - Hill Contours

Type CS. Split screen, side by side. On left is contour form of hill. On right is actual line drawing of hill from high oblique angle with contour lines superimposed in brown.

M-6 - Valley Contours

Type CS. Split screen, top and bottom. On bottom is realistic view of valley with hills rising on the left and right. There is no stream running through the valley, but a main stream runs across

the base of the hills, perpendicular to the valley line. Contour lines are superimposed in brown. On top is contour form of valley showing intermittent stream running through valley.

M-7 - Ridge Contours

Type CS. Split screen, top and bottom. On bottom is contour form of ridge line. On top is high oblique line drawing of ridge with contour lines in brown superimposed.

M-8 - Contours of Depression

Type CS. Split screen, top and bottom. On top is contour form of depression. On bottom is line drawing, very high oblique view (bird's-eye) with contour lines in brown superimposed.

M-9 - Contour Interpretation

Type CS. Split screen, top and bottom. On top is contour drawing of saddle with arrowed route (marked in red) crossing from one hilltop to another. On bottom is profile view of same terrain showing route (marked with red arrows) going up one hill, down into the valley, and up the second hill.

M-10 - Terrain Model with Contours

Type CS. Line drawing of a section of terrain incorporating hill, valley, ridge, stream, and depression. Light brown contour lines are superimposed.

M-11 - DRILL. Which one of the following ground forms is found at Point 1? At Point 2? At Point 3?

(a) hilltop (b) wet valley (c) dry valley (d) ridge

(Choices will vary in subsequent drill slides.)

Type CS. Map area not to exceed 1000m in width. Use raised contour map, using shadows to emphasize slope and depth. The following points should be pinpointed: hilltop, dry valley, ridge.

M-12 - DRILL.

Same as M-11, but pinpointed are: depression, dry valley, stream.

M-13 - DRILL.

Same as M-11, but pinpointed are: ridge, hilltop, depression.

M-14 - DRILL

Same as M-11, except use a flat, two dimensional map when photographing. The following points should be pinpointed: woods, swamp, lake.

M-15 - DRILL.

Same as M-14, but pinpointed are: house, improved road, trail.

M-16 - DRILL.

Same as M-14, but pinpointed are: ridge, dry valley, hilltop.

M-17 - Copy the Meter Rule

Type MLC. Overhead view of mile and meter scales showing hand with pencil, drawing ruler of meter scale. Ruler is partially completed and each line is numbered appropriately. The paper used as a ruler must be easily distinguishable from the background paper.

M-18 - Measuring Distance

Type CCU. Area of map with two points marked off and connected by a line. Meter ruler is placed alongside line with 0 position at one point.

M-19 - What is the Distance A-B in Meters?

Same as M-18.

M-20 - What is Distance A-B in Meters?

Same as M-18.

M-21 - What is Distance B-C in Meters?

Same as M-18.

M-22 - Map Symbols (Review)

Same as M-3.

M-23 - Terrain Model With Contours (Review)

Same as M-10.

M-24 - Copy the Meter Rule (Review)

Same as M-17.

M-25 - Correction Value of Checkpoints

Type BS. The spot, two line, line and spot, parallel line and line across the route types of checkpoints are depicted. The type of correction that each type affords is written beneath each.

M-26 - A Checkpoint Aids Navigation

Type CS. Diagrammatic sketch of map showing roadline (unimproved road - broken line) intersecting woodline. Prescribed route (in yellow) runs to intersection (X), continues across hilltop and into objective. Route traveled (in red) deviates right to the road, turns left to correct, then moves toward objective, again bearing right, missing hilltop and also objective. Woods in green wash, hilltop contours in brown, broken roadline in black.

M-27 - Terrain Checkpoints

Type CCU. Map section not to exceed 1000m in width on a 1:12,500 map; a hilltop, dry valley, intermittent stream, ridge, and intersection of two valleys are pointed out and numbered consecutively.

M-28 - Checkpoint Composition

Same as M-3.

M-29 - DRILL. Which one of the following checkpoints is found at Point 1? At Point 2? At Point 3?

Type CCU. Map section, 1:12,500, not to exceed 1000m in width, with the following points pinpointed and numbered consecutively: road crossing hilltop, crossroad, stream.

K-30 - DRILL.

Same as K-29, but with dry valley, house on woodline, and junction of two streams pinpointed.

K-31 - DRILL.

Same as K-29, but with house on road, hilltop, and ridge pinpointed.

K-32 - DRILL.

Same as K-29, but with stream and pond, stream and depression, and stream and road pinpointed.

K-33. DRILL.

Same as K-29, but with junction of two wet valleys, house on stream, and dry valley pinpointed.

K-34. Sharpness of Slope

Type CS. Split screen, top and bottom. On top, low sloping hilltop, vertical arrows pointing to extremities, horizontal arrows pointing toward midpoint and large red vertical arrow pointing to center. Bottom is profile of hilltop, fairly well defined, with single red arrow vertically pointing toward center.

K-35 - Sharpness of Woodline

Type BS. Split screen, top and bottom. Top has clearly defined break where woods stop and clearing begins. Angled red arrow points toward checkpoint. Bottom shows thick woods on left gradually thinning out into clearing. Vertical arrows point to extremities of thinning area, horizontal arrows indicate midpoint. Vertical red arrow points to center position.

K-36 - Sharpness of Man-Made Features

Type BS. Split screen, side by side. On left is old house foundation, overgrown with vegetation. Rotting timbers, remnant of chimney, overgrown foundation visible. On same plane on right is neat house, well kept lawn, picket fence, smoke coming from chimney.

M-37 - Map Orientation

Type BS. Low oblique view of section of terrain; road intersection, stream and woods on right, hill and woods directly ahead. Map displayed on ground at left with symbols of above features oriented to their respective positions on the ground. "Your Position" is marked both on the ground and on the map.

M-38 - The Map

Same as M-2.

M-39 - Magnetic North Scales

Type BS. Split screen. At left is enlarged declination diagram taking up approximately 1/4 of the screen. At right is a slightly enlarged right hand portion of the mock-up, showing top scale and "p" point.

M-40 - Draw Magnetic North Line

Type BLCU. Close-up overhead view of declination line being drawn. The right side of the map is placed in a central position. Heavy black line is drawn from "p" to the 10° mark at the top of the mock-up. Both hands are visible, one holding the pencil, the other steadying the map.

M-41 - Map Is Lined Up With Compass

Type BLCU. 90° angle shot of a squatting soldier in the field. Map is on the grass with declination line clearly visible. Compass is on top of map, and declination line is lined up with North arrow of compass.

M-42 - Map Is Oriented

Type BLCU. Close-up overhead view of mock-up with compass on top of it. The North arrow, sight wire and declination line are lined up. Two hands are visible, steadying map. Scale at the top should be clearly visible.

M-43 - Correction Value of Checkpoints (Review)

Same as M-25.

M-44 - Sharpness of Woodline (Review)

Same as M-35.

M-45 - Draw Magnetic North Line (Review)

Same as M-40.

M-46 - Map is Oriented (Review)

Same as M-42.

PERIOD THREE
ANSWER SHEET
DRILL IN MAP SYMBOLISM

Student's Name (Print) _____
(Last) (First)

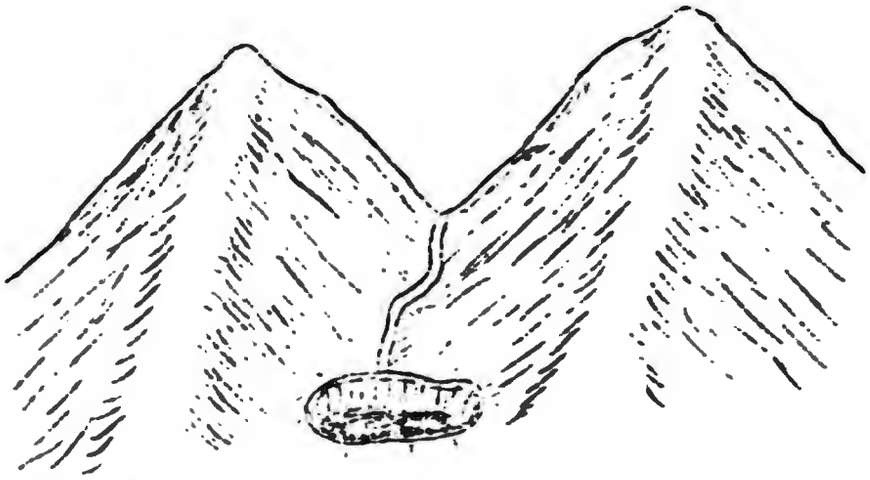
Score
Total Number Wrong

Slide Number	Point #	Possible Choices			
M11	1	a	b	c	d
	2	a	b	c	d
	3	a	b	c	d
M12	1	a	b	c	d
	2	a	b	c	d
	3	a	b	c	d
M13	1	a	b	c	d
	2	a	b	c	d
	3	a	b	c	d
M14	1	a	b	c	d
	2	a	b	c	d
	3	a	b	c	d

Fig 26. "Page One, Answer Sheet, Map Symbolism," Period Three.

Slide Number	Point #	Possible Choices			
M15	1	a	b	c	d
	2	a	b	c	d
	3	a	b	c	d
M16	1	a	b	c	d
	2	a	b	c	d
	3	a	b	c	d

Contour Exercise



Distance Measurement Drill

M19	a	b	c	d
M20	a	b	c	d
M21	a	b	c	d

Fig 27. "Page Two, Answer Sheet, Map Symbolism," Period Three.

Slide Number Checkpoint Drill	Point #	Possible Choices			
M29	1	a	b	c	d
	2	a	b	c	d
	3	a	b	c	d
M30	1	a	b	c	d
	2	a	b	c	d
	3	a	b	c	d
M31	1	a	b	c	d
	2	a	b	c	d
	3	a	b	c	d
M32	1	a	b	c	d
	2	a	b	c	d
	3	a	b	c	d
M33	1	a	b	c	d
	2	a	b	c	d
	3	a	b	c	d

Fig 26. "Page Three, Answer Sheet, Map Symbolism," Period Three.

SECTION IV

PERIOD FOUR: MAP-TERRAIN ASSOCIATION

1. Orientation Aid

Enlarged Section of Training Area

(1) 4' x 4' framed enlarged map, in color, of the route with each checkpoint marked and appropriately numbered.

(2) Meter scale and declination diagram must be shown.

(3) Checkpoints must be labeled so as not to obscure the contour lines which surround them. (See Fig 32.)

(4) Scale of map: 100m per 4". Total map area shown will not exceed a 1200m square.

2. Route Traversing Aids

a. Individual Maps

(1) Each student will have a 1:25,000 contour map of the general area. This map will have the magnetic north line drawn in and distance scales shown.

(2) The checkpoints must be indicated and numbered on each map. (See Fig 1.)

b. Raised Contour Maps

Each AI will be equipped with one raised contour map, 1:25,000, of the area concerned. Checkpoints will be marked and numbered as indicated in Fig 1.

c. Terrain Checklist

(1) Each AI will be equipped with a terrain checklist reproduced on 5 x 8 cards.

(2) This list will contain all information shown in Figs 30 and 31.

d. Route Sketch

(1) Each student and AI will be equipped with a route sketch, mimeographed on a 8 x 10-1/2 sheet of paper.

(2) The route sketch will consist of a line drawing of the route approximating as closely as possible the relative distances and directions between checkpoints.

(3) Checkpoints Nr 6 and 1 will be pinpointed by an arrow. A space will be set off at the end of the arrow and labeled as shown on Fig 29.

(4) The area between Checkpoints Nr 6 and 7 and between Checkpoints Nr 1 and 2 will also be pointed out by arrows and space will be allocated as shown on Fig 29.

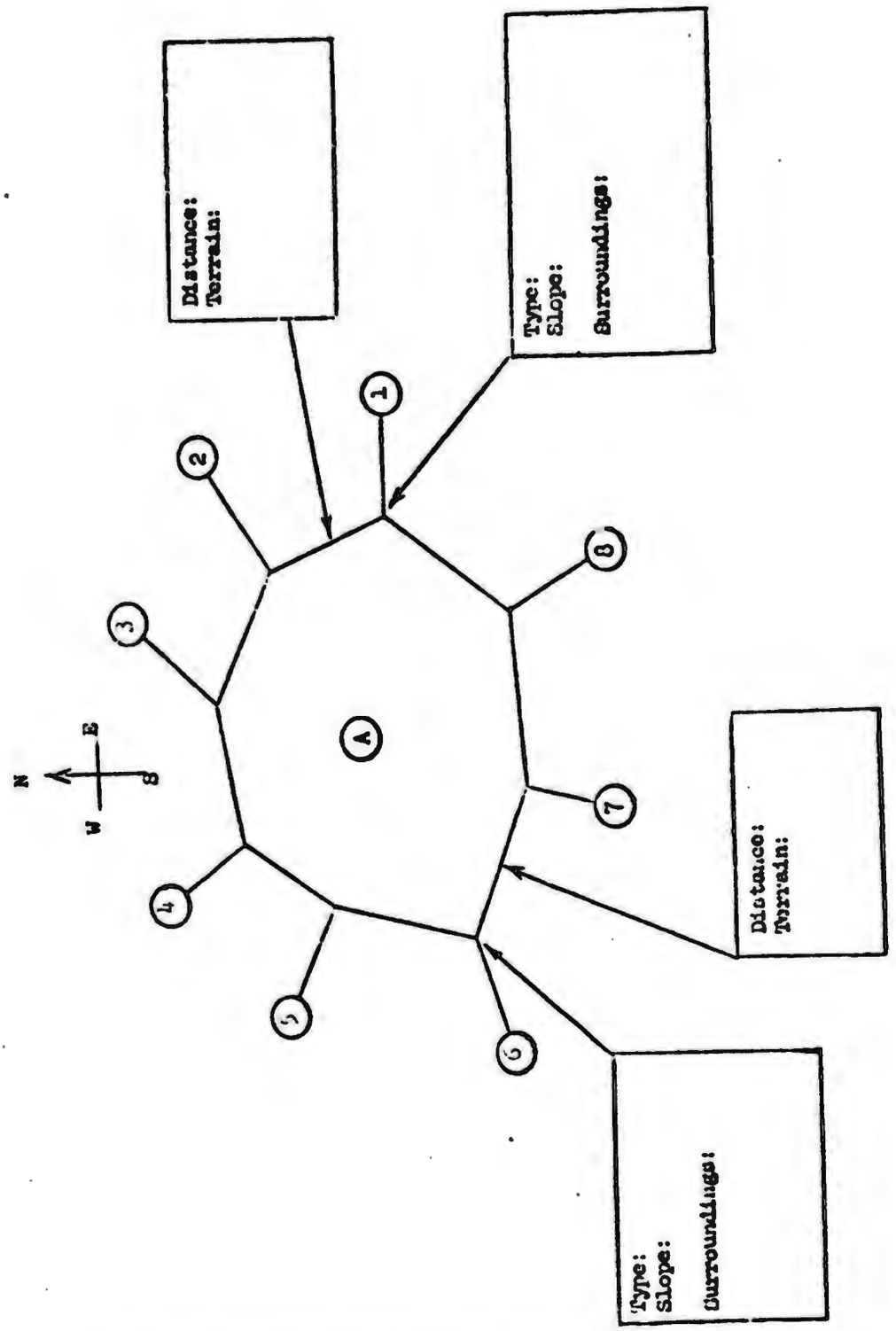


Fig. 29. "Route Sketch Format," Period Four.

CHECKPOINT CHECKLIST

(1) Chpt # & Name	(2) Type and Information	(3) Appearance and Clarity	(4) Ground Orientation Reference Points	(5) To next checkpoint: Distance	(6) Terrain
1. hilltop	(spot) direction & distance	Ground slopes down on four sides gradually. Broad top-vague checkpoint. (Find midpoint)	Terrain: valley and hill N. Man-made: road to E. Vegetation: clear with woods to NE.	125m	Slope down to small valley between two hills (saddle).
2. stream source (intermittent)	(line-spot) direction & distance	Ground slopes gently up on three and down on one side. Heavy vegetation at stream. Sharp checkpoint.	Terrain: hills to N & S. Vegetation: heavy to W.	125m	slope down, follow streamline
3. valley	(line, parallel) direction	Ground slopes down on three and up on one side. Sharp checkpoint	Terrain: stream bed just S. Vegetation: heavy	150m	slope down into clearing
4. power line	(line, across route) distance	Clear area with lines and poles across. Sharp checkpoint.	Terrain: low hilltop W. Man-made: no lines-decay; cut, N-S, only thing left	90m	follow cut, fairly level.

Figure 30. Checkpoint Checklist, Face of Card, Period Four.

(1) Cpt # & Name	(2) Type and Information	(3) Appearance and Clarity	(4) Ground Orientation Reference Points	(5) To next checkpoint: Distance	(6) Terrain
5. stream crosses power line	(two line) direction & distance	intermittent stream crosses cut. Sharp checkpoint	Terrain: downward slope W into depression; ridge to E. Man-made: cut, N-S	200m	follow cut, ground rises to ridge back.
6. ridge crosses power line	(two line) direction & distance	Ground slopes down on three and up on one side crossed by cut. Broad back ridge, vague checkpoint.	Terrain: Ridge slopes up to E, down sharply to S. Vegetation: clear in cut Man-made: road S.	150m	up ridgeline.
7. ridge-line	(line, parallel) direction	Ground slopes up on on three and down on one side. Vague checkpoint.	Terrain: sharp drop to S Man-made: dirt road not on map; road S	175m	up ridgeline to hilltop
8. hilltop & ridge	(line-spot) direction & distance	Ground slopes down on all four sides. Broad top, vague checkpoint. (Find midpoint.)	Terrain: steep slope down S, gentle N. Vegetation: clear	150m	up gentle slope to broad hilltop

Figure 31. Reverse Side of Card, Checkpoint Checklist, Period Four.

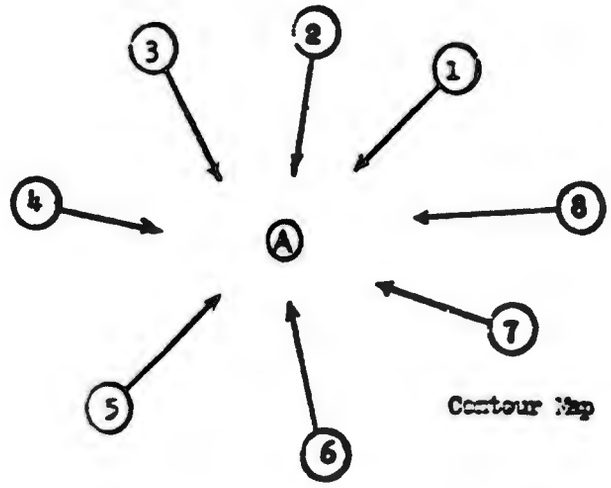


Fig 32. "Method of Marking Checkpoints on a Map," (A) is assembly area. Checkpoints are located at tip of arrows.

SECTION V

PERIOD FIVE Nr: NIGHT LAND NAVIGATION EXERCISE

1. Objective Locator Scale

a. Purpose of the scale is to facilitate rapid criticuing of the performance of the 2-man team by the AI's at each objective.

b. The scale is reproduced on standard 5 x 8 inch cards as shown in Fig 33. Cards should be produced in sufficient quantity to provide replacement of worn or damaged cards.

c. The AI orients the scale with respect to the objective (X-OBJ) and the taped line bearing the panel numbers. Two elements of information, a distance in meters and a panel number, are reported by each team. AI procedure is as follows:

(1) Commencing at 0 in the bottom left corner of the scale, the AI reads UP to DISTANCE REPORTED BY TEAM. Assume 99 meters reported by a team as an example.

(2) Commencing at 1 in the bottom right corner of the scale, the AI reads the PANEL NUMBERS, 1 through 13. Assume Panel Nr 9 reported by a team as an example.

(3) Reading UP the left-hand scale to 100, the AI then reads across the bottom scale to 9 and places his pencil at the point of coincidence of the two lines.

(4) A glance at the top (RIGHT-LEFT) scale indicates that the team was approximately 50 meters to the right of the objective.

(5) A glance at the right-hand (SHORT-OVER) scale indicates that the team was approximately 25 meters short of the objective.

(6) The sample report indicates the team was RIGHT 50 meters, SHORT 25 meters. The team members are so informed verbally and by pointing to the oriented map whereon the true objective is marked with a dot and the student-selected objective is pointed out by use of a pencil point. The AI must learn to judge distance on the map to insure that the teams receive factual critiques. Distances to the nearest 25 yards are

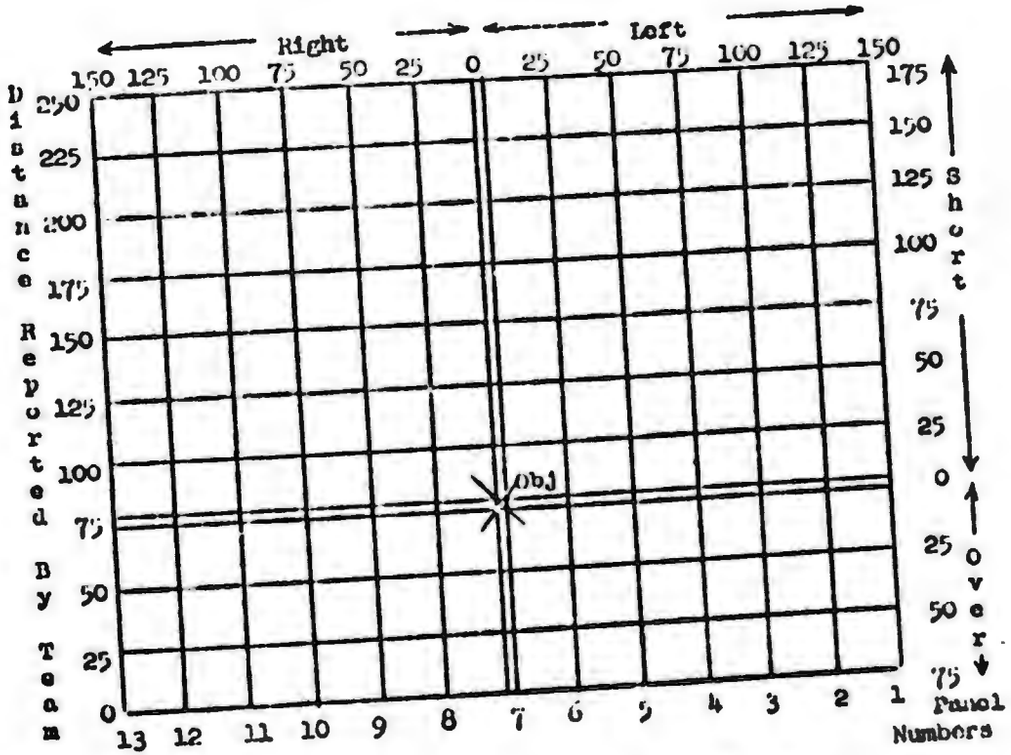


Fig 33. "Objective Locator Scale, "Right Lard Navigation Course, Period Five N. One copy, reproduced on 5 x 8 inch card, is required for each AI.

deemed to be sufficiently accurate; however, all objectives should be plotted with maximum practicable accuracy.

(7) Team performance is recorded on the team's Route Information Card.

2. Briefing Maps

One briefing map, 1:25,000, showing the two appropriate routes, the assigned starting point, the two objectives, and a magnetic north line, is provided for each starting point. For recurring use, the maps may be reduced to pocket-size and covered with acetate. Course designation (RED, BLUE, etc) and starting point numbers should be clearly marked on each map. Four students (1st and 2d orders, each starting point) use the map for study during the briefing at the unit area under the supervision of the AI's. At the starting point, the map is again oriented on the ground and the team about to be dispatched is given a maximum of two minutes to review the route and objectives using a red-shielded flashlight for illumination. Similar 1:25,000 maps are employed by the AI's for critiquing at each objective. Objectives must not be obscured by markings.

3. Route Information Cards

Route Information Cards are reproduced on standard white 5 x 8 inch cards. Entries under FROM, TO, DIR. (magnetic azimuth), MAP DIST. (in meters), must be made with heavy, black grease pencil so the information may be read at night without artificial illumination. Names, starting point numbers, order numbers, course designations (RED, BLUE, etc), azimuths, and map distances are entered prior to formation of troops for orientation. Times and distances under OBJ-A, OBJ-B, and OBJ-C are entered by the AI's at appropriate objectives. Ground distances and panel numbers are entered by students. AI's must insure during the briefing that students understand, prior to being dispatched, what entries must be made on the Route Information Card. Route Information Card is shown in Fig 34 and 35.

4. Typical Route Chart

Chart is employed by the PI during orientation. See Fig 36, "Two Typical Routes, Night Land Navigation Course." While the figure in the text is shown in black and white, the chart employed for classroom instruction may use blue for one route and red for the other route for the sake of clarity. No terminal line panel numbers are shown on the chart because known sequence

Fig. 34. "Face of Route Information Card, Period Five M." Entries for students must be made by hand in black grease pencil to be read without artificial light. See Fig 35, reverse of card.

ROUTE INFORMATION CARD

NAME: _____ _____ _____
(Last) (First)

RACE: _____

START POINT ORDER COURSE
PT: _____ NR: _____ (RED, BLUE, etc)

TIME OUT: _____ hrs.

	OBJ-A	OBJ-B	OBJ-C
ARRIVED	_____ hrs.	_____ hrs.	_____ hrs.
RIGHT	_____ m.	_____ m.	_____ m.
LEFT	_____ m.	_____ m.	_____ m.
SHORT	_____ m.	_____ m.	_____ m.
OVER	_____ m.	_____ m.	_____ m.

(NOTE: All's enter all distances in meters to nearest 25 meters.)

Figure 35. Reverse Side of Route Information Card, Period Five N.

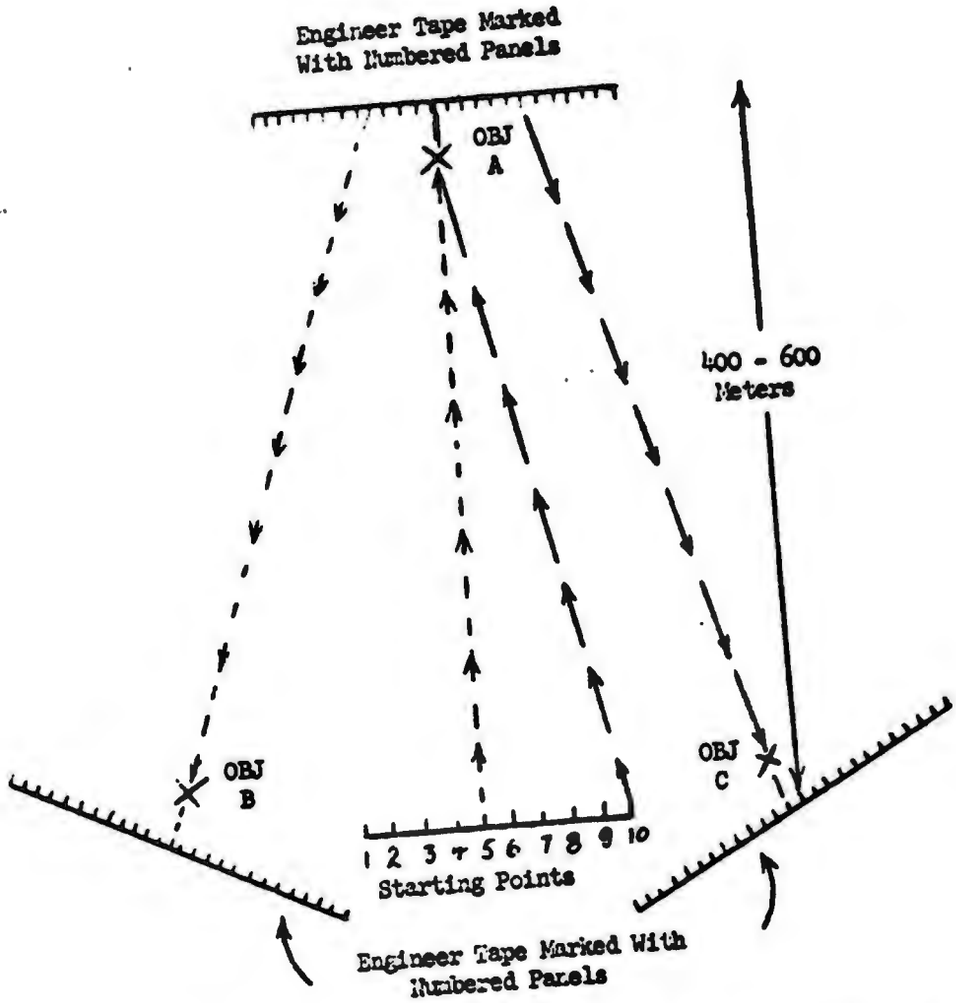


Fig 36. "Two Typical Routes, Night Land Navigation Course," Period Five N.

of numbers might tempt the student to use the panel numbers as a reference to locate the pinpoint objective. A typical panel with numeral and direction arrow is shown to the students during orientation. In preparing the chart for classroom use, the figure number is omitted and the title is placed at the top of the chart.

APPENDIX III

CONSTRUCTION OF FIELD PHYSICAL FACILITIES

1. General

The field physical facilities required for PATROL I Land Navigation training were designed to accommodate a maximum of 80 students simultaneously. A careful study of the instructional material and a detailed map and ground reconnaissance of the local area must precede the selection of sites for the field installations. The details pertinent to the construction required for each period of instruction are set forth in the following pages. The descriptions of panels and stakes for the courses are shown in Tables VI and IX.

2. Panel Requirements

a. Period One, "Compass Sighting Course"

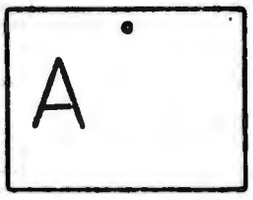
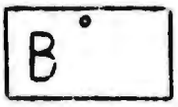
The panels on this course will have a number on the front of the panel and a letter plus the same number on the back. The listing below presents the full information for the backs. The letter will be of a different color than the number. All panels are of Type A.

List of Numbers and Letters:

				Total
A-38	J-19	S-11	BB-32	
B-2	K-14	T-31	CC-8	
C-41	L-9	U-21	DD-13	
D-33	M-29	V-3	EE-7	
E-34	N-28	W-43	FF-6	
F-4	O-26	X-22	GG-15	
G-27	P-42	Y-23	HH-36	
H-39	Q-37	Z-17	JJ-12	
I-24	R-1	AA-18	KK-44	36
1 panel will read "Compass Sighting Course"				1
			Grand Total	37

TABLE VI

DESCRIPTION OF PANELS

Panel Type	Description	Primary Use
	Size: 1' x 1-1/2' Hole: Diameter 1/2", 1-1/2" from top center Figures: 4" wide, 6" high, 1" wide line	Periods One and Two
	Size: 6" x 1' Hole: Diameter 1/2", 1-1/2" from top center Figures: 2-1/2" wide, 3" high, 1/2" wide line	Periods One and Two

(NOTE: Materials: For permanent use, plywood, hardboard, or metal is suggested. For temporary use, cardboard or plastic may be used. A waterproofing coat is desirable for the porous materials. A rigid, white surface is desired.

Markings: Enamel or printer's ink may be used, in black color.

Form: Panels are rectangular, with a hole at top center for the purpose of hanging on stakes.)

b. Period One, "Sighting Range"

Fifteen (15) Type A panels will have a large letter on one side.

List of Letters:

					Total
A	D	G	J	M	
B	E	H	K	N	
C	F	I	L	O	15

Fifteen (15) Type B panels will have a number on one side.

Numbers 1 through 15 — 15

Identifying panel (Type A) to read "Sighting Range" — 1

Grand Total — 31

(NOTE: Panels at objectives for Period One should be of sturdy material, i.e., wood. For subsequent periods, this is not imperative.)

c. Period Two, "Maintaining Direction While Moving"

Thirty-six Type B panels will read on one side as listed below. The reverse side will contain only the number. Numbers in black, letters in red.

				Total
A-33	J-39	S-2	BB-31	
B-43	K-27	T-36	CC-12	
C-17	L-19	U-4	DD-29	
D-9	M-11	V-34	EE-18	
E-1	N-3	W-44	FF-21	
F-6	O-8	X-28	GG-23	
G-14	P-16	Y-7	HH-26	
H-22	Q-24	Z-38	JJ-13	
I-42	R-32	AA-41	KK-37	36

	Total
One copy, series 1 through 36 (Panel Type B)	36
Identifying panel (Type A), "Maintaining Direction While Moving"	1
Grand Total	73

d. Period Two, "Determining the Individual Standard"

"Determining the Individual Standard" (Panel Type A)	1
"Pacing Easy Ground" (Panel Type A)	1
"Pacing Moderate Ground" (Panel Type A)	1
"Pacing Rough Ground" (Panel Type A)	1
"Start 100 Meters" (Panel Type A)	3
"Finish 100 Meters" (Panel Type A)	3
"Return" (Panel Type A)	3
"25M" (Panel Type B)	3
"50M" (Panel Type B)	3
"75M" (Panel Type B)	3
Grand Total	22

(NOTE: A figure appears only on one side of the panel. Color is black.)

		Total
e.	Period Two, "Applying the Standard"	
	Identifying panel (Type A), "Applying the Standard"	1
	One copy of series 1 through 23 (Panel Type B)	23
	Grand Total	24
f.	Period Two, "Detouring"	
	Identifying panel (Type A), "Detouring"	1
	One copy, series 1 through 12 (Panel Type B)	12
	One copy, series A through E: Numbers 1 through 36 in each letter series (Panel Type B)	180
	Grand Total	193
g.	Period Two, "Dead Reckoning"	
	Identifying panel (Type A), "Dead Reckoning"	1
	Two copies, series A through L: Numbers 1 through 9 in each letter series (Panel Type B)	216
	Grand Total	217
h.	Period Three	
	(None)	0
i.	Period Four, "Map-Terrain Association"	
	Identifying panel (Type A), "Map-Terrain Association"	1
	One copy, series 1 through 8 (Panel Type B)	8
	Grand Total	9

	Total
j. Period Five N, "Land Navigation"	
Identifying panel (Type A), "Land Navigation"	1
4 copies, series 1 through 7, with arrow under number pointing <u>right</u> (Panel Type A)	28
4 copies, series 8 through 13, with arrow under number pointing <u>left</u> (Panel Type A)	24
(<u>NOTE</u>: Panel hangs vertically, with arrow extending across short dimension of panel.)	
2 copies, series 1 through 10 (Panel Type B)	20
Grand Total	73

TABLE VII

PANEL REQUIREMENT

(Organized By Periods)

Course Title	Type A	Type B	Total
Period One, "Compass Sighting Course"	37	0	37
Period One, "Compass Sighting Range"	16	15	31
Period Two, "Maintaining Direction While Moving"	1	72	73
Period Two, "Determining the Individual Standard"	13	9	22
Period Two, "Applying the Standard"	1	23	24
Period Two, "Detouring"	1	192	193
Period Two, "Dead Reckoning"	1	216	217
Period Three	0	0	0
Period Four, "Map-Terrain Association"	1	8	9
Period Five N, "Land Navigation"	53	20	73
GRAND TOTAL	124	555	679

TABLE VIII

PANEL REQUIREMENT

(Organized by Panel Types)

TYPE A PANELS

(Total - 124)

Front	Back	Nr of Panels	Front	Back	Nr of Panels
38	A-38	1	18	AA-18	1
2	B-2	1	32	BB-32	1
41	C-41	1	8	CC-8	1
33	D-33	1	13	DD-13	1
34	E-34	1	7	EE-7	1
4	F-4	1	6	FF-6	1
27	G-27	1	16	GG-16	1
39	H-39	1	36	HH-36	1
24	I-24	1	12	JJ-12	1
19	J-19	1	44	KK-44	1
14	K-14	1			
9	L-9	1	A	Blank	1
29	M-29	1	B	"	1
28	N-28	1	C	"	1
26	O-26	1	D	"	1
42	P-42	1	E	"	1
37	Q-37	1	F	"	1
1	R-1	1	G	"	1
11	S-11	1	H	"	1
31	T-31	1	I	"	1
21	U-21	1	J	"	1
3	V-3	1	K	"	1
43	W-43	1	L	"	1
22	X-22	1	M	"	1
23	Y-23	1	N	"	1
17	Z-17	1	O	"	1

TYPE A PANELS

Front	Nr of Panels	Front	Nr of Panels
1 →	4	COMPASS SIGHTING COURSE	1
2 →	4	SIGHTING RANGE	1
3 →	4	MAINTAINING DIRECTION WHILE MOVING	1
4 →	4	DETERMINING THE INDIVIDUAL STANDARD	1
5 →	4	PACING EASY GROUND	1
6 →	4	PACING MODERATE GROUND	1
7 →	4	PACING ROUGH GROUND	1
8 ←	4	START 100 METERS	3
9 ←	4	FINISH 100 METERS	3
10 ←	4	RETURN	3
11 ←	4	APPLYING THE STANDARD	1
12 ←	4	DETOURING	1
13 ←	4	DEAD RECKONING	1
		MAP-TERRAIN ASSOCIATION	1
		LAND NAVIGATION	1

(NOTE: All panels will be blank on back, arrowed panels will be used vertically.)

TYPE B PANELS

(Total - 555)

Front	Back	Nr of Panels	Front	Back	Nr of Panels
1	Blank	7	K-11	11	1
2	"	7	N-3	3	1
3	"	7	O-8	8	1
4	"	7	P-16	16	1
5	"	7	Q-24	24	1
6	"	7	R-32	32	1
7	"	7	S-2	2	1
8	"	7	T-36	36	1
9	"	6	U-4	4	1
10	"	6	V-34	34	1
11	"	4	W-44	44	1
12	"	4	X-28	28	1
13	"	3	Y-7	7	1
14	"	3	Z-38	38	1
15	"	3	AA-41	41	1
			BB-31	31	1
A-33	33	1	CC-12	12	1
B-43	43	1	DD-29	29	1
C-17	17	1	EE-18	18	1
D-9	9	1	FF-21	21	1
E-1	1	1	GG-23	23	1
F-6	6	1	HH-26	26	1
G-14	14	1	JJ-13	13	1
H-22	22	1	KK-37	37	1
I-42	42	1			
J-39	39	1	16	Blank	2
K-27	27	1	17	"	2
L-19	19	1	18	"	2

TYPE B PANELS (continued)

Front	Back	Nr of Panels	Front	Back	Nr of Panels
19	Blank	2	25M	Blank	3
20	"	2	75M	"	3
21	"	2			
22	"	2	A1	"	3
23	"	2	A2	"	3
24	"	1	A3	"	3
25	"	1	A4	"	3
26	"	1	A5	"	3
27	"	1	A6	"	3
28	"	1	A7	"	3
29	"	1	A8	"	3
30	"	1	A9	"	3
31	"	1	A10	"	1
32	"	1	A11	"	1
33	"	1	A12	"	1
34	"	1	A13	"	1
35	"	1			
36	"	1			

TYPE B PANELS (Continued).

On Front	Nr of Panels	On Front	Nr of Panels
A14	1	B7	3
A15	1	B8	3
A16	1	B9	3
A17	1	B10	1
A18	1	B11	1
A19	1	B12	1
A20	1	B13	1
A21	1	B14	1
A22	1	B15	1
A23	1	B16	1
A24	1	B17	1
A25	1	B18	1
A26	1	B19	1
A27	1	B20	1
A28	1	B21	1
A29	1	B22	1
A30	1	B23	1
A31	1	B24	1
A32	1	B25	1
A33	1	B26	1
A34	1	B27	1
A35	1	B28	1
A36	1	B29	1
B1	3	B30	1
B2	3	B31	1
B3	3	B32	1
B4	3	B33	1
B5	3	B34	1
B6	3	B35	1

TYPE B PANELS (Continued)

On Front	Nr of Panels	On Front	Nr of Panels
B36	1	C29	1
C1	3	C30	1
C2	3	C31	1
C3	3	C32	1
C4	3	C33	1
C5	3	C34	1
C6	3	C35	1
C7	3	C36	1
C8	3	D1	3
C9	3	D2	3
C10	1	D3	3
C11	1	D4	3
C12	1	D5	3
C13	1	D6	3
C14	1	D7	3
C15	1	D8	3
C16	1	D9	3
C17	1	D10	1
C18	1	D11	1
C19	1	D12	1
C20	1	D13	1
C21	1	D14	1
C22	1	D15	1
C23	1	D16	1
C24	1	D17	1
C25	1	D18	1
C26	1	D19	1
C27	1	D20	1
C28	1	D21	1

TYPE B PANELS (Continued)

On Front	Nr of Panels	On Front	Nr of Panels
D22	1	E15	1
D23	1	E16	1
D24	1	E17	1
D25	1	E18	1
D26	1	E19	1
D27	1	E20	1
D28	1	E21	1
D29	1	E22	1
D30	1	E23	1
D31	1	E24	1
D32	1	E25	1
D33	1	E26	1
D34	1	E27	1
D35	1	E28	1
D36	1	E29	1
E1	3	E30	1
E2	3	E31	1
E3	3	E32	1
E4	3	E33	1
E5	3	E34	1
E6	3	E35	1
E7	3	E36	1
E8	3	F1	2
E9	3	F2	2
E10	1	F3	2
E11	1	F4	2
E12	1	F5	2
E13	1	F6	2
E14	1	F7	2

TYPE B PANELS (Continued)

On Front	Nr of Panels	On Front	Nr of Panels
F8	2	J1	2
F9	2	J2	2
G1	2	J3	2
G2	2	J4	2
G3	2	J5	2
G4	2	J6	2
G5	2	J7	2
G6	2	J8	2
G7	2	J9	2
G8	2	K1	2
G9	2	K2	2
H1	2	K3	2
H2	2	K4	2
H3	2	K5	2
H4	2	K6	2
H5	2	K7	2
H6	2	K8	2
H7	2	K9	2
H8	2	L1	2
H9	2	L2	2
I1	2	L3	2
I2	2	L4	2
I3	2	L5	2
I4	2	L6	2
I5	2	L7	2
I6	2	L8	2
I7	2	L9	2
I8	2	SCR	3
I9	2		

(NOTE: This Table (Table VIII) and the preceding Table (Table VII) refer to the same panel requirement.)

TABLE IX

DESCRIPTION OF STAKES

Stake Type	Description	Primary Use
I	Size: 9' x 4" x 1" Nail: 2" from top Set: 2' in ground	Periods One and Two
II	Size: 4' x 4" x 1" Nail: 1" from top Set: 1' in ground	Periods One and Two

3. Stake Requirements

TABLE X

STAKE REQUIREMENT

Course Title	Type I	Type II	Total
Period One, "Compass Sighting Course"	37	0	37
Period One, "Sighting Range"	19	15	34
Period Two, "Maintaining Direction While Moving"	37	36	73
Period Two, "Determining the Individual Standard"	13	9	22
Period Two, "Applying the Standard"	1	23	24
Period Two, "Detouring"	1	192	193
Period Two, "Dead Reckoning"	1	216	217
Period Three	0	0	0

TABLE X (Continued)

STAKE REQUIREMENTS

Course Title	Type I	Type II	Total
Period Four, "Map Terrain Association"	1	8	9
Period Five N, "Land Navigation"	1	20	21
GRAND TOTAL	111	519	630

4. Engineer Tape Requirement

"Engineer tape," as listed, is a Quartermaster Corps item of standard issue. The item should be requisitioned as: Tape, textile, general purpose, cotton, herringbone twill weave, white. The tape is 3/4" wide and is issued in 500 foot rolls (approximately 152 meters). The Federal Stock Number is 8315-260-0342.

TABLE XI

ENGINEER TAPE REQUIREMENT

Course	Meters
Period One	0
Period Two, "Maintaining Direction While Moving"	515
Period Two, "Determining the Individual Standard"	612
Period Two, "Applying the Standard"	344
Period Two, "Detouring"	0
Period Two, "Dead Reckoning"	0
Period Three	0
Period Four, "Map-Terrain Association"	0
Period Five N, "Land Navigation"	3000
TOTAL	4471

SECTION I

PERIOD ONE, USE OF COMPASS

1. Detailed Description of Construction - Compass Sighting Course

a. References

(1) General Diagram of Compass Sighting Course, Fig. 38.

(2) Detailed Diagram of Compass Sighting Course, Fig. 39.

(3) Description of Stakes, Table IX.

(4) Description of Panels, Table VI.

b. The General Diagram shows that the course consists of a circle and a Sighting Range laid out on flat, cleared ground.

c. The circle consists of 36 stakes located every 10 degrees along the perimeter, beginning from a magnetic north baseline. The Detailed Diagram shows these 10-degree intervals between stakes and the designation of each stake in parentheses. The circle has a radius of 22.9 yards, with a stake located every four (4) yards along the perimeter.

d. The stakes used are Type I listed in Table IX. For the circle thirty-six (36) are required; one is needed for the P I stake. Stakes will be placed so as to have the nailhead pointing toward the center.

e. The panels used are Type A listed in Table VI. The front of each panel contains a number; the back, an alphabetical letter coupled with the number repeated. The PI stake will support a panel reading "Compass Sighting Course."

f. Underbrush within the circle must not exceed three feet in height. Any trees must be removed. The ground at the base of each stake will be cleared of underbrush to a height under six (6) inches for a radius of two (2) yards from each stake as a center.

2. Detailed Description of Construction - Sighting Range

a. References

(1) General Diagram of Sighting Range, Fig. 40.

(2) Detailed Diagram of Sighting Range, Fig. 41.

(3) General Diagram of Compass Sighting Course and Sighting Range, Fig. 37.

(4) Description of Stakes, Table IX.

(5) Description of Panels, Table VI.

b. The general diagram shows that the range consists of a student sighting line and an objective panel line laid out on flat, cleared ground.

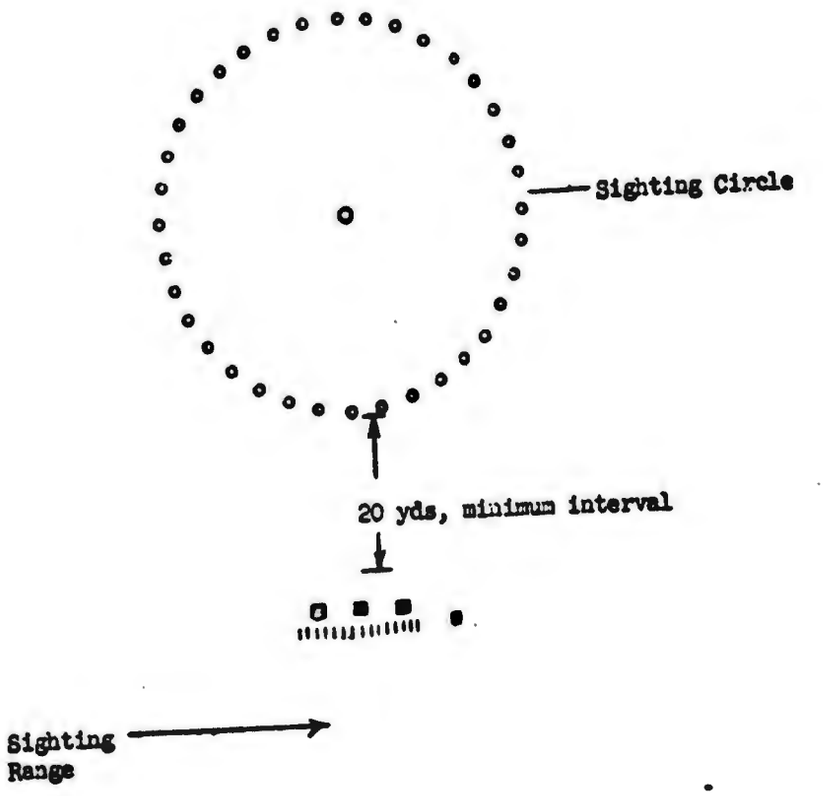
c. The detailed diagram shows that the range consists of 15 stakes located on a sighting line 1 yard apart. On a line 58 yards from the sighting line and parallel to it, is a line formed by four groups of 3 stakes each. One group of three stakes is on a line 57 yards from the sighting line. The stakes are 1.5 yards apart. One stake is placed on the sighting line 5 yards from the first stake. Three stakes are located 5 yards behind the sighting line, 5 yards apart. With respect to an imaginary line perpendicular to both lines, Panel H is 20° right from Student Stake 13, and Panel B is 20° left from Stake 3.

d. The 15 stakes (numbered 1-15) used for the sighting line are Type II listed in Description of Stakes. The stakes which support lettered panels, identifying panel, and scoring key panels are Type I.

e. The lettered panels are Type A listed in Description of Panels. One stake supports a Type A panel reading "Sighting Range." Three other stakes support Type A panels. These panels are faced with sheets of 8 x 10 bond paper, listing the correct degree readings to the panel stakes.

f. Underbrush on the range must not exceed 3 feet in height. Any trees must be removed. The ground on the sighting line will be cleared of underbrush to a height under six inches for a two yard radius from each stake.

g. The directional orientation of this course is determined by terrain. A sample arrangement of both sighting problems is shown by Fig. 37.



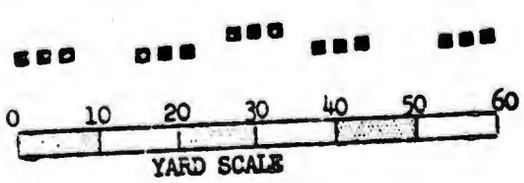


Fig 37. "General Diagram of Compass Sighting Course and Sighting Range," Period One

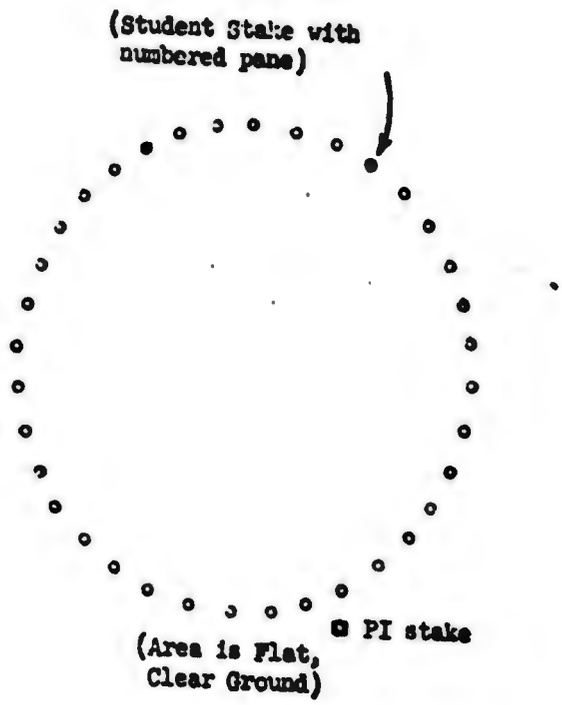


Fig 38. "General Diagram of Compass Sighting Course,"
Period One

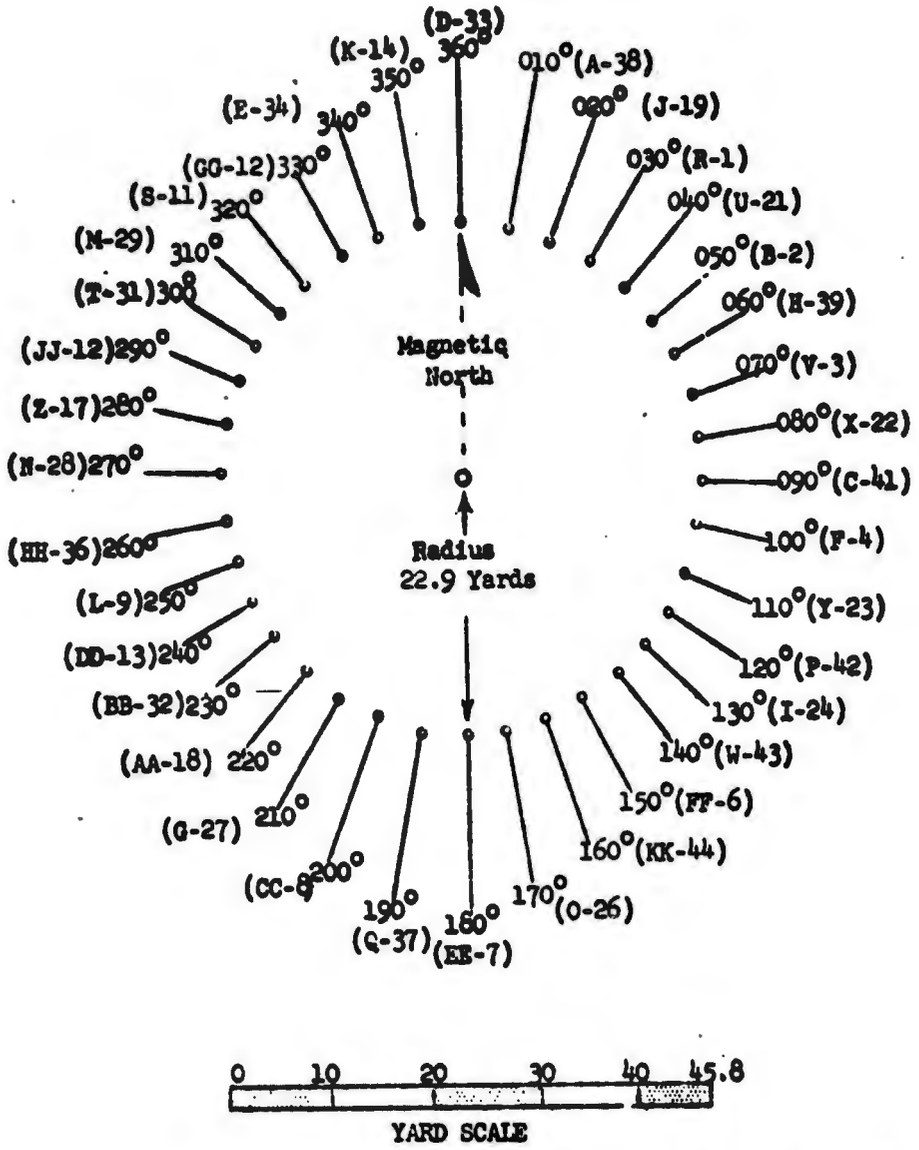
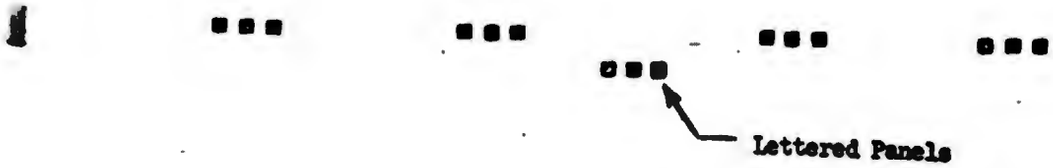


Fig 39. "Detailed Diagram of Compass Sighting Course," Period One



Flat Clear Ground

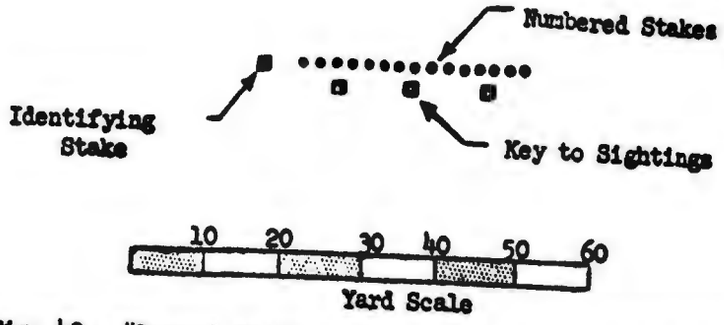


Fig. 40. "General Diagram of Sighting Range," Period One.

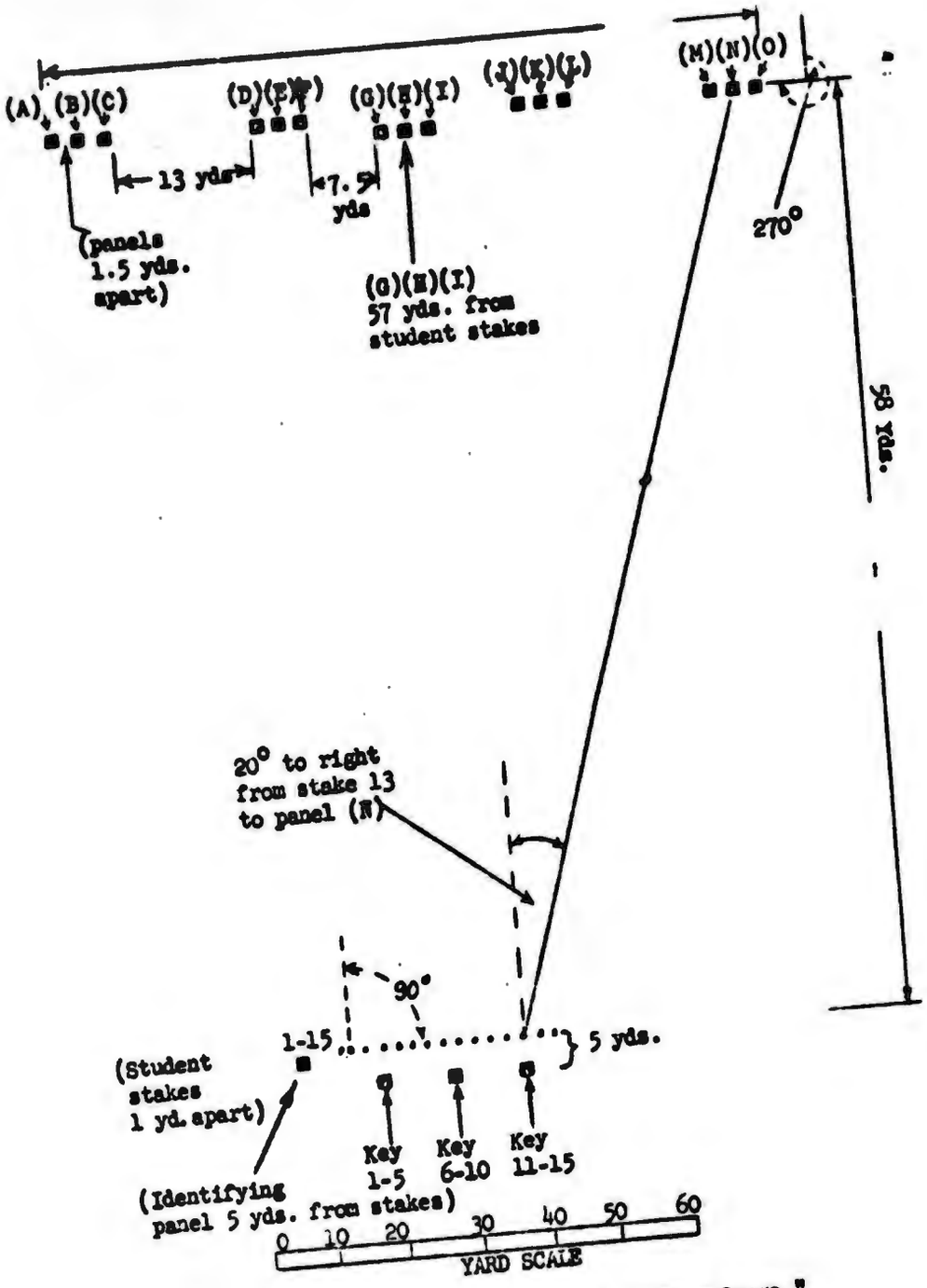


Fig 41. "Detailed Diagram of Sighting Range," Period I

SECTION II

PERIOD TWO: DEAD RECKONING

1. Detailed Description of Construction - "Maintaining Direction While Moving," Period Two

a. References

(1) General Diagram of "Maintaining Direction While Moving," Fig 42

(2) Detailed Diagram of Inner Starting Circle, Fig 43

(3) Detailed Diagram of Outer Circle, Fig 44

(4) Description of Stakes, Table IX

(5) Description of Panels, Table VI

b. The general diagram shows that the course consists of two circles laid out on relatively flat, wooded ground. One circle encloses the other.

c. The detailed diagrams indicate that each circle consists of 36 stakes, located along the perimeter every 10 degrees from the center, beginning from a magnetic north line.

d. The inner circle has a radius of 15 yards and a perimeter of 94.2 yards with the stakes emplaced every 2.6 yards. The 36 stakes required are Type II listed in the Description of Stakes. These support 36 Type B panels, listed in the Description of Panels. The nailheads face the circle center. The circle center will be marked by a Type I stake supporting two panels, reading "Maintaining Direction While Moving."

e. The outer circle has a radius of 90 yards and a perimeter of 565.2 yards with the panels placed every 15.7 yards. This outer circle will be further defined by a line of white engineer tape 3/4 inch wide. The 36 stakes used are Type II; each supports a panel of Type B. The nailheads face the circle center.

f. The inner circle should be cleared of underbrush and small trees (under 15 feet) to a height under 6 inches. This clearing will extend two (2) yards beyond the perimeter. The outer circle requires that the area for a radius of 1-1/2 yards around each stake, be cleared to the same height.

(NOTE: "Engineer tape," as listed, is a Quartermaster Corps item of standard issue. The item should be requisitioned as: Tape, textile, general purpose, cotton, herringbone twill weave, white. The tape is 3/4" wide and is issued in 500-foot rolls. The Federal Stock Number is 8315-260-0342.)

2. Detailed Description of Construction - "Determining the Individual Standard," Period Two

a. References

(1) Detailed Diagram, "Determining the Individual Standard," Fig 45

(2) Description of Stakes, Table IX

(3) Description of Panels, Table VI

b. The diagram shows one of three identical courses. Each course consists of an elongated rectangle, forming a lane. One course is laid out on flat, cleared ground, another on moderate ground, and the last on rough ground. Each lane is 100 meters long by two meters wide and is defined on the ground by white engineer tape 3/4 inches wide. This tape should be tied down flush with the ground by small pegs. These pegs may be set at irregular intervals, as required.

c. Panels will appear on the lanes as follows:

(1) All three courses are identified by a sign placed centrally, reading "Determining the Individual Standard" (panel Type A, stake Type I).

(2) Each lane is further identified by individual signs reading:

(a) "Pacing Easy Ground" (panel Type A, stake Type I)

(b) "Pacing Moderate Ground" (panel Type A, stake Type I)

(c) "Pacing Rough Ground" (panel Type A, stake Type I)

(3) Each lane also has the following staked panels:

(a) "Start 100 meters" (panel Type A, stake Type I)

(b) "Finish 100 meters" (panel Type A, stake Type I)

(c) "Return" (panel Type A, stake Type I)

(d) "25M" (panel Type B, stake Type II)

(e) "50M" (panel Type B, stake Type II)

(f) "75M" (panel Type B, stake Type II)

(NOTE: These Type B panels should be placed at 25 meter intervals, along each lane, with two panels hanging back to back on each stake.)

d. The terrain and vegetation conditions for each lane should be as follows:

(1) Easy course: level, firm ground, cleared of underbrush and trees to a height under 6 inches.

(2) Moderate course: hilly, firm ground, with underbrush 12" high but cleared of trees.

(3) Rough course: very hilly, soft ground, with dense underbrush 24" high and densely wooded.

3. Detailed Description of Construction - "Applying the Standard," Period Two

a. References

(1) Detailed Diagram, "Applying the Standard," Fig 46

(2) Description of Stakes, Table IX

(3) Description of Panels, Table VI

b. The detailed diagram shows that the course consists of an elongated rectangle, forming a lane, laid out on varying terrain. The lane is 350 meters by 2 meters, defined on the ground by white engineer tape, 3/4 inches wide and 704 meters long. This tape should be tied down flush with the ground by small pegs. These pegs are set at irregular intervals as required.

c. From the detailed diagram, it may be seen that at one end of the lane there are four starting points marked by stakes. The points are ten meters apart, a total of 30 meters. The next 60 meters are unmarked, followed by 6 stakes at 10 meter intervals. The next 50 meters are unmarked, followed by another string of 6 stakes at 10 meter intervals. The next 50 meters are unmarked, and the last 60 meters are set off by 7 stakes at 10 meter intervals. The ground distance can be chained off along the ground, over the valley surface if necessary. However, the distance mission is essentially a map distance, or straight line distance. Therefore, if a line of sight is clear, the surveyor should measure by the stadia method, from one end to the other. The 10 meter intervals may be chained off.

d. The 23 marking stakes are Type II. Each supports a Type B panel as listed in Table VI, Description of Panels. The panels will bear the numerical designations given, emplaced so as to face the starting end of the lane. The identifying stake, placed 4 meters from the starting end, is Type I, supporting a Type A panel, reading "Applying the Standard."

e. The entire area enclosed by the engineer tape is on varying terrain of hills, level ground, and underbrush varying from low to very dense.

(1) Each of the three types of terrain (i.e., easy, moderate, and rough) is equally represented, in a random order.

(2) Each type is represented as a stretch of that particular type not exceeding 50 meters.

(3) The type of terrain does not end exactly at 25 meter intervals, but appears to be randomly distributed.

(4) The staked areas are emplaced on relatively flat, cleared ground.

4. Detailed Description of Construction - "Detouring," Period Two

a. References

(1) General Diagram, "Detouring," Fig 47

(2) Detailed Diagram of the Inner Start Circle, "Detouring," Fig 48

Fig 49 (3) Detailed Diagram of the "A" Circle, "Detouring,"

Fig 50 (4) Detailed Diagram of the "B" Circle, "Detouring,"

Fig 51 (5) Detailed Diagram of the "C" Circle, "Detouring,"

Fig 52 (6) Detailed Diagram of the "D" Circle, "Detouring,"

Fig 53 (7) Detailed Diagram of the "E" Circle, "Detouring,"

Fig 54 (8) Detailed Diagram of Obstructions, "Detouring,"

(9) Description of Panels, Table VI

(10) Description of Stakes, Table IX

b. The general diagram of the Detouring Course shows that the course consists of an inner starting circle, and five outer circles laid out over flat, cleared ground. Each circle is enclosed by another.

c. All detailed diagrams of the five outer circles, Figs 49, 50, 51, 52, 53, show that each circle consists of 36 stakes located along the perimeter every 10 degrees from the center. On circles A, C, and E, the numbered stakes begin from a magnetic north base line; on circles B and D, the numbered stakes begin from the 5° mark.

d. The inner circle has a radius of 15 meters and a perimeter of 94.2 meters with stakes emplaced every 30° (or 7.8 meters) beginning from a magnetic north base line. The 12 stakes used are Type II stakes listed in Table IX, Description of Stakes. Each stake will be numbered appropriately with the numbers facing the center of the circle. The center is marked by a Type I stake, supporting a Type A panel, reading "Detouring."

e. The "A" circle has a radius of 50 meters and a perimeter of 314.2 meters with stakes placed every 10° (or 8.7 meters) beginning from a magnetic north base line. The stakes are of Type II, and numbered appropriately. The numbers face away from the circle center.

f. The "B" circle has a radius of 60 meters and a perimeter of 377 meters with stakes placed every 10° (or 10.5 meters) beginning from the 5° mark. The stakes are of Type II and numbered appropriately. The numbers face away from the circle center.

g. The "C" circle has a radius of 70 meters and a perimeter of 439.8 meters with stakes placed every 10° (or 12.2 meters) beginning from the magnetic north base line. The stakes are of Type II and numbered appropriately. The numbers face away from the circle center.

h. The "D" circle has a radius of 80 meters and a perimeter of 502.7 meters with stakes placed every 10° (or 13.9 meters) beginning at the 5° mark. The stakes are of Type II and numbered appropriately. The numbers face away from the circle center.

i. The "E" circle has a radius of 90 meters and a perimeter of 565.5 meters with stakes placed every 10° (or 15.7 meters) beginning at the magnetic north base line. The stakes are of Type II and numbered appropriately. The numbers face away from the circle center.

j. The Detailed Diagram of Obstructions, Fig 54, shows the use of 12 latrine screens laid out in straight line fashion (see FM 20-15, "Tents and Tent Pitching," Jan 1956, p 61). The screens will be pitched perpendicularly to the radii of the circle, with the center of each screen at intervals of 30° (or 18.3 meters) beginning from a magnetic north base line. The screens prescribe a circle with a radius of 35 meters. At the end of each screen, extending away from the circle center, are 5 meters of barbed wire fencing placed perpendicular to the screen.

5. Detailed Description of Construction - "Dead Reckoning," Period Two

a. References

(1) Detailed Diagram, "Dead Reckoning," Fig 55

(2) Description of Panels, Table VI

(3) Description of Stakes, Table IX

b. The detailed diagram of the Dead Reckoning Course shows it to consist of two rectangular pegboards of 108 stakes each.

The stakes are of Type II listed in the Description of Stakes, Table IX. They will be numbered as shown. The two pegboards are separated by a space of 25 meters, with a ten meter interval separating one stake from the next. The long rectangle formed by the two pegboards runs lengthwise along the magnetic north base line.

c. The entire area will be sparsely wooded and on flat ground. A Type I stake, placed between pegboards and off to the side, will support two Type A panels, back to back, reading "Dead Reckoning." The panels will face each end of the rectangle.

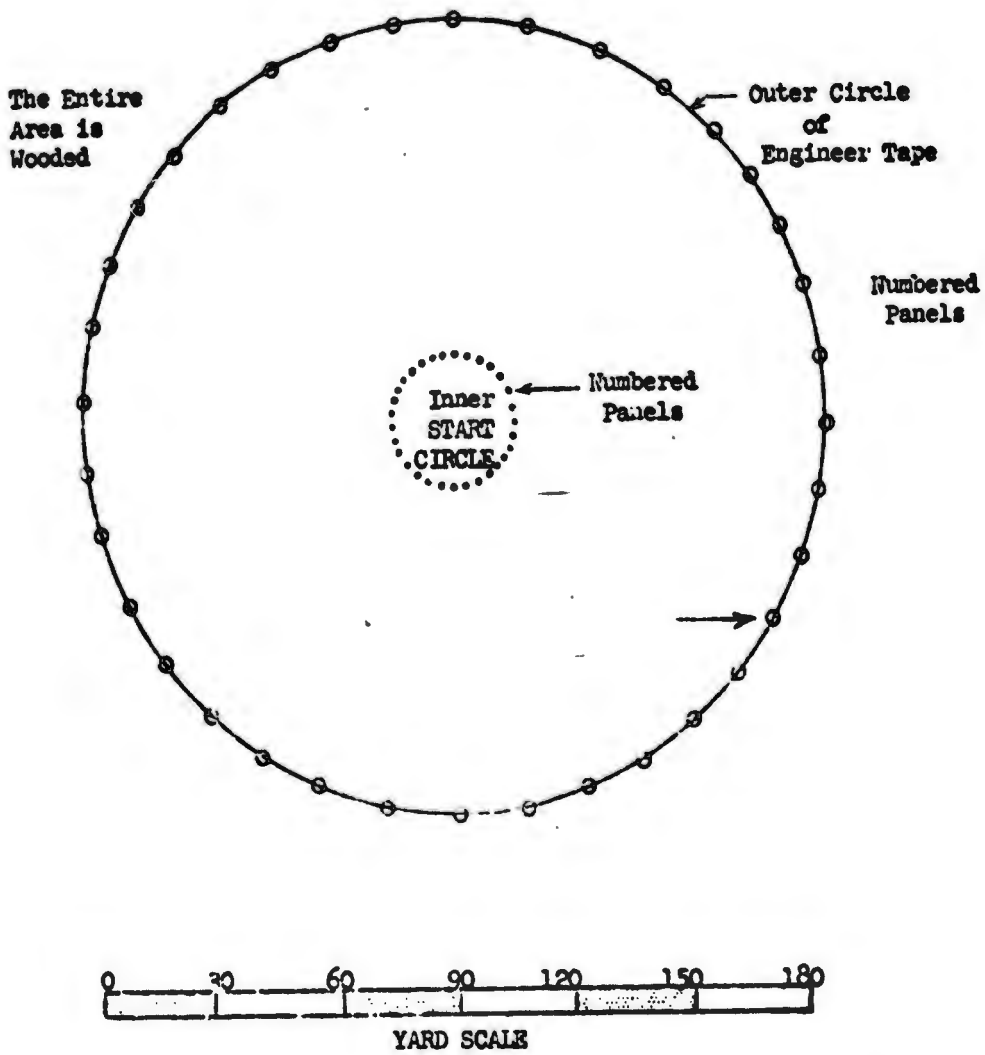


Fig 42. "General Diagram of Maintaining Direction While Moving," Period Two

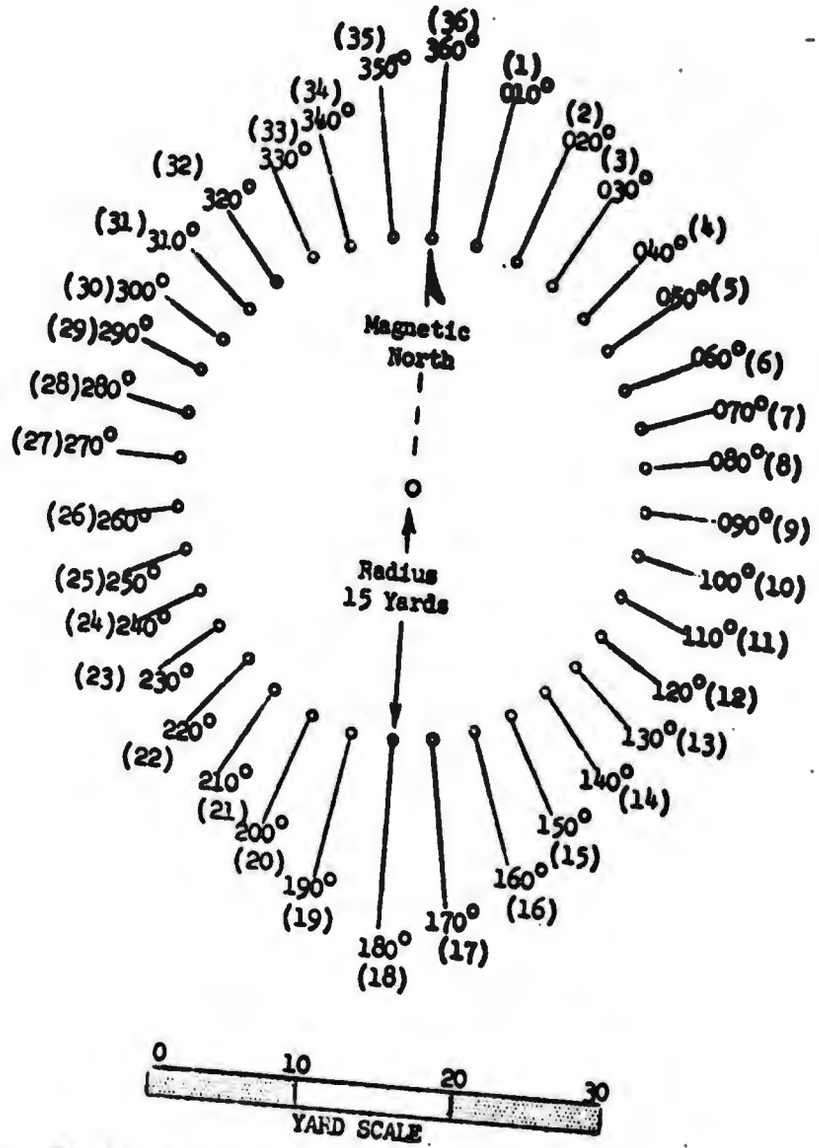


Fig 43. "Detailed Diagram of the Inner Starting Circle, Maintaining Direction While Moving," Period Two

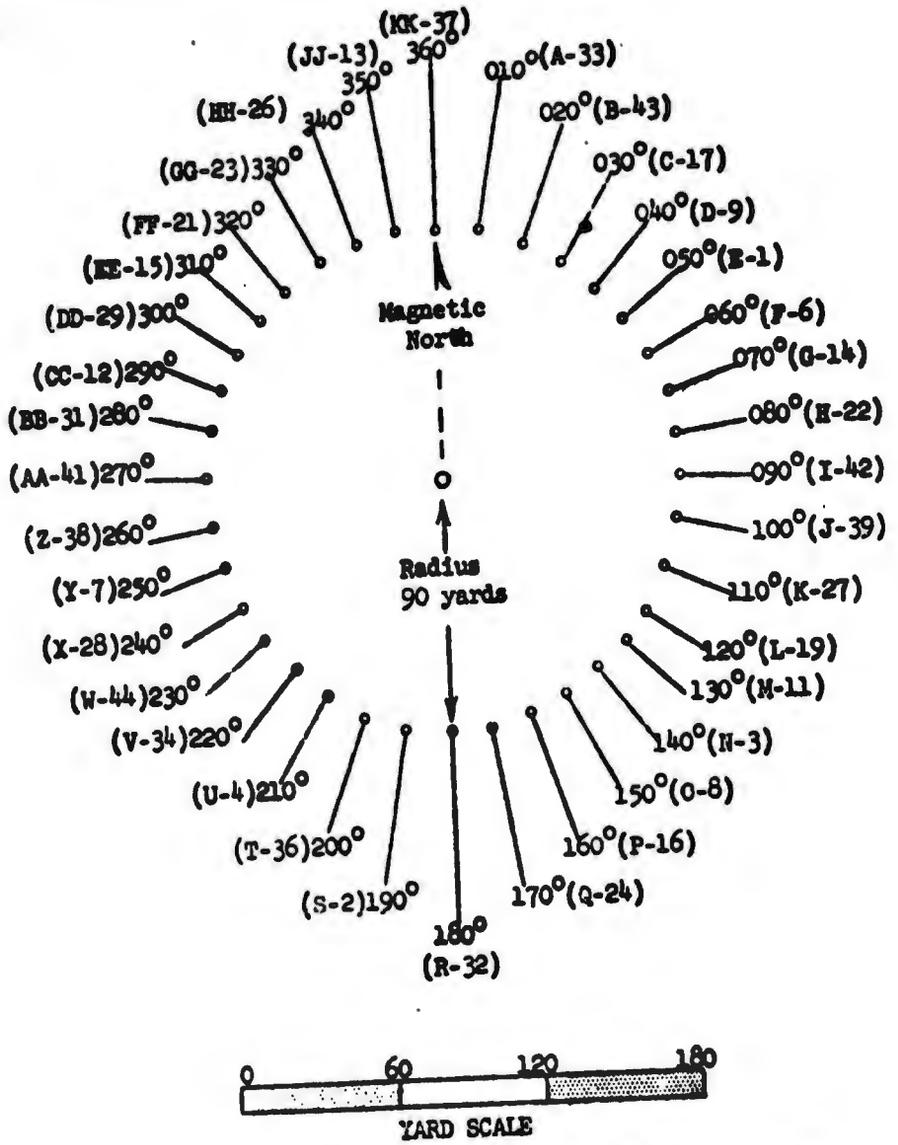


Fig 44. "Detailed Diagram of the Outer Circle, Maintaining Direction While Moving," Period Two

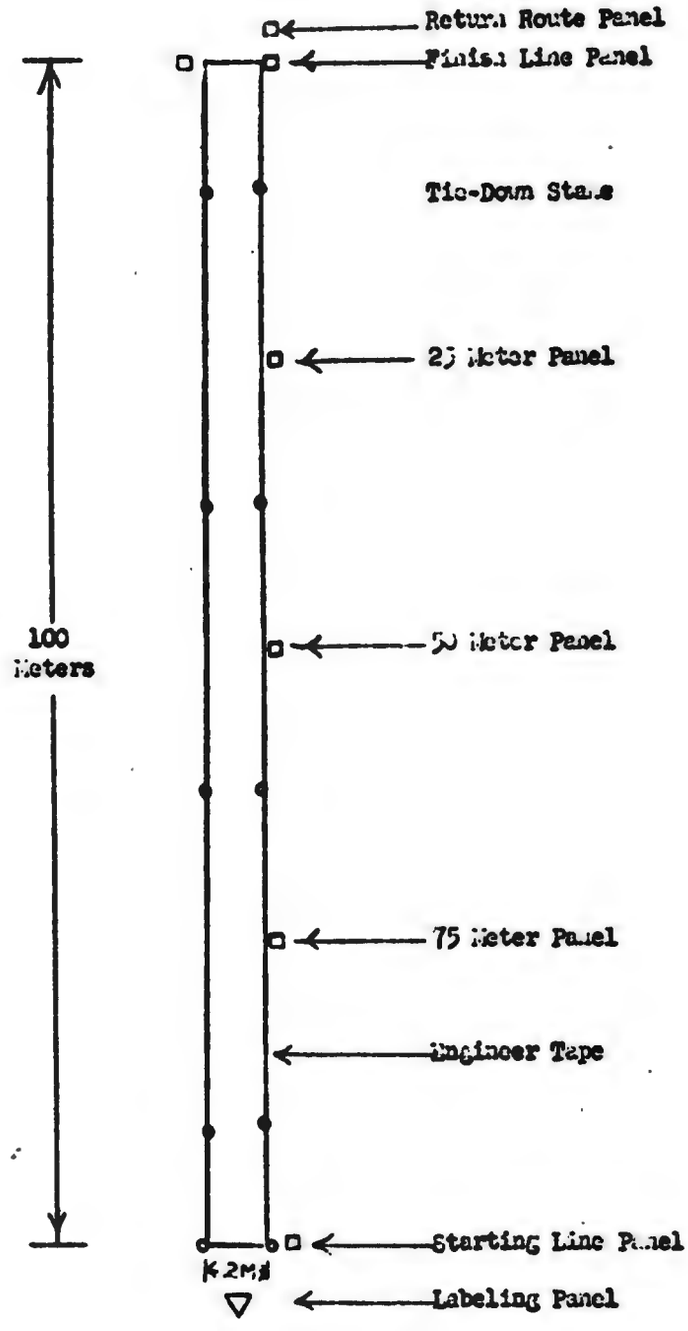


Fig 45. "Detailed Diagram, Determining the Individual Standard," Period Two

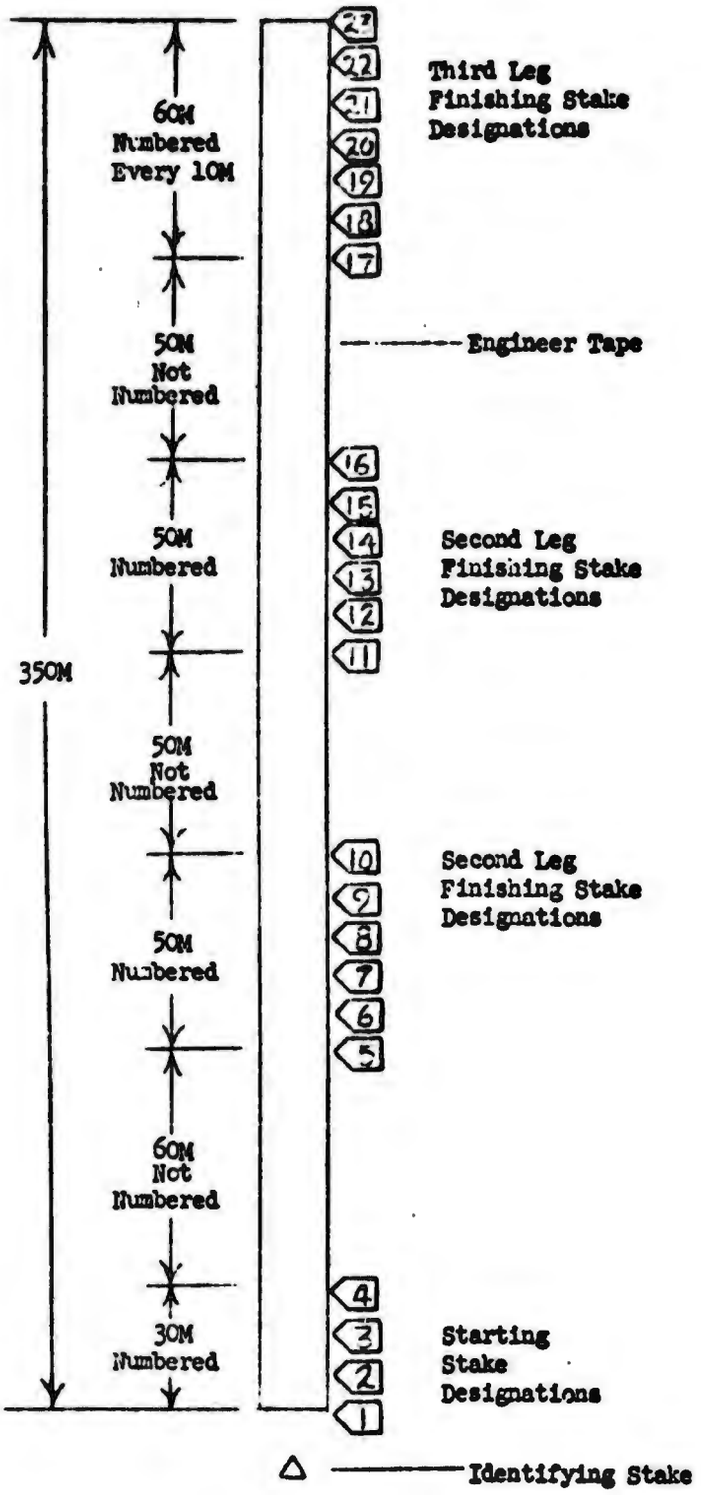


Fig 46. "Detailed Diagram, Applying the Standard," Period Two

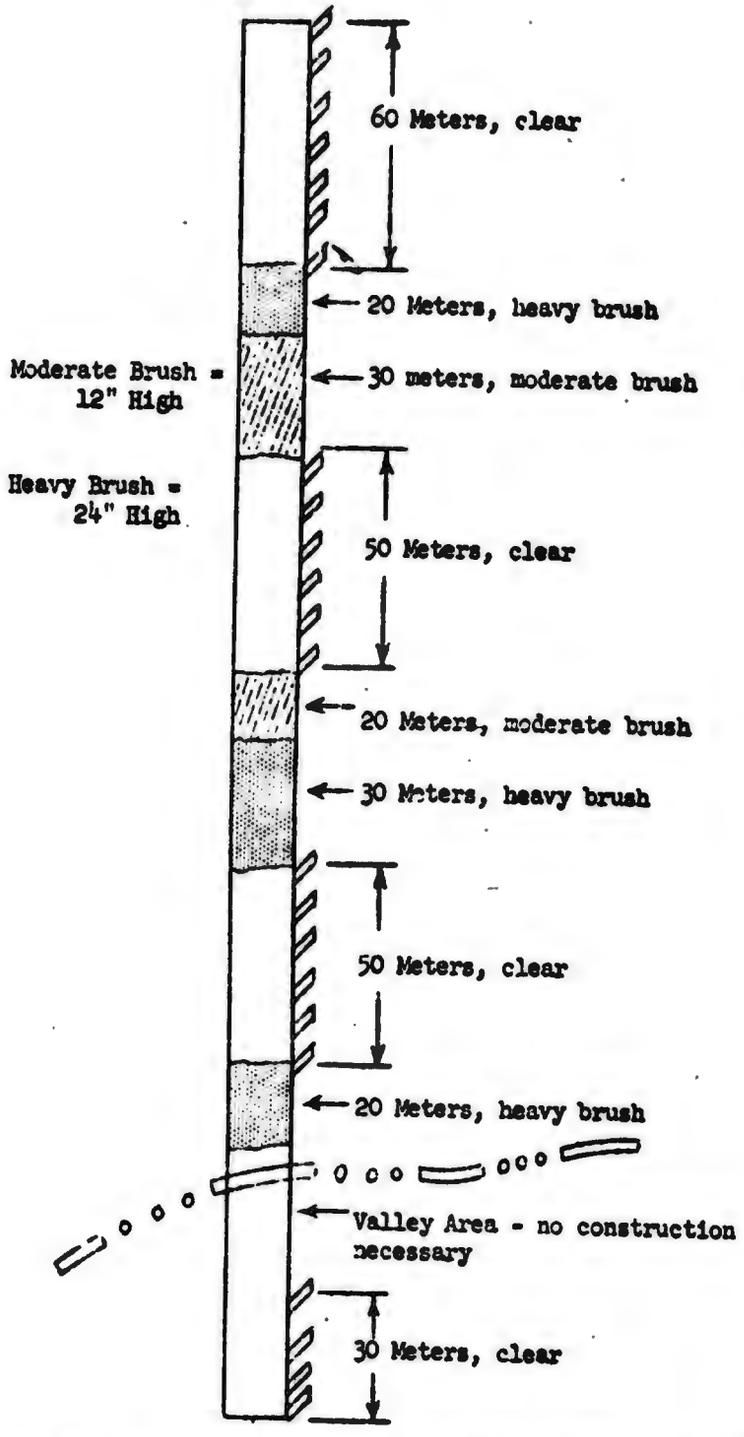


Figure 46a. "Sample Construction of Course," Applying the Standard, Period Two.

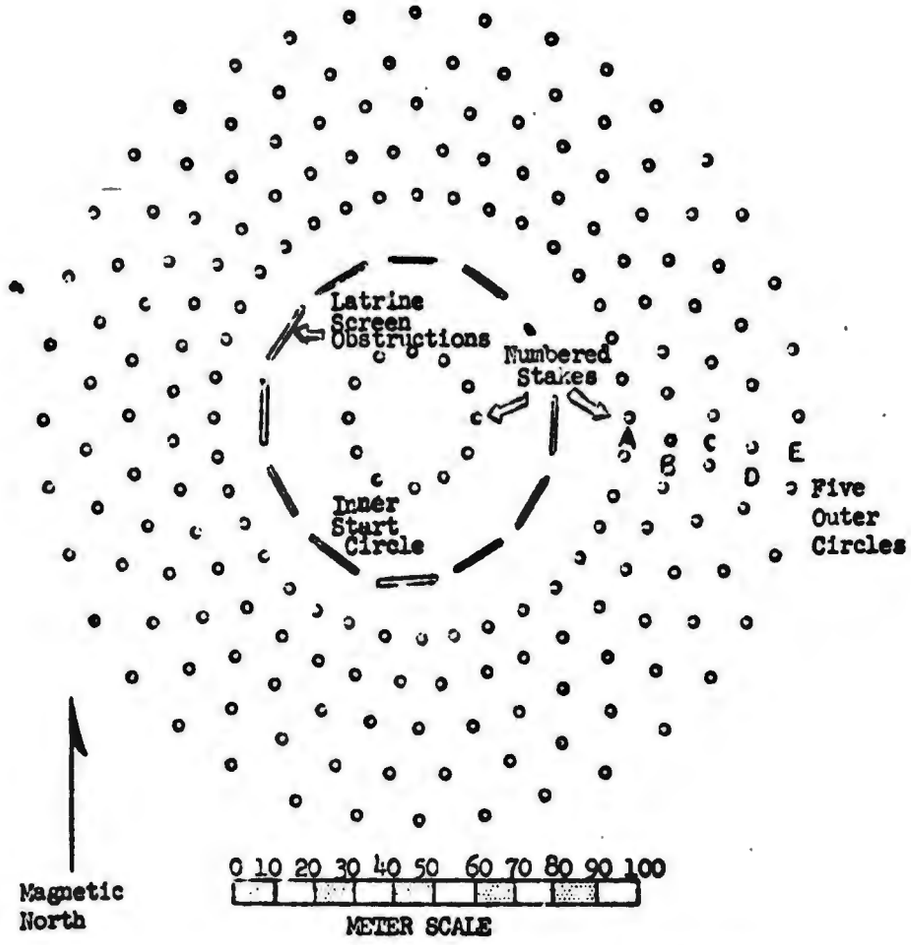


Fig 47. "General Diagram, Detouring," Period Two

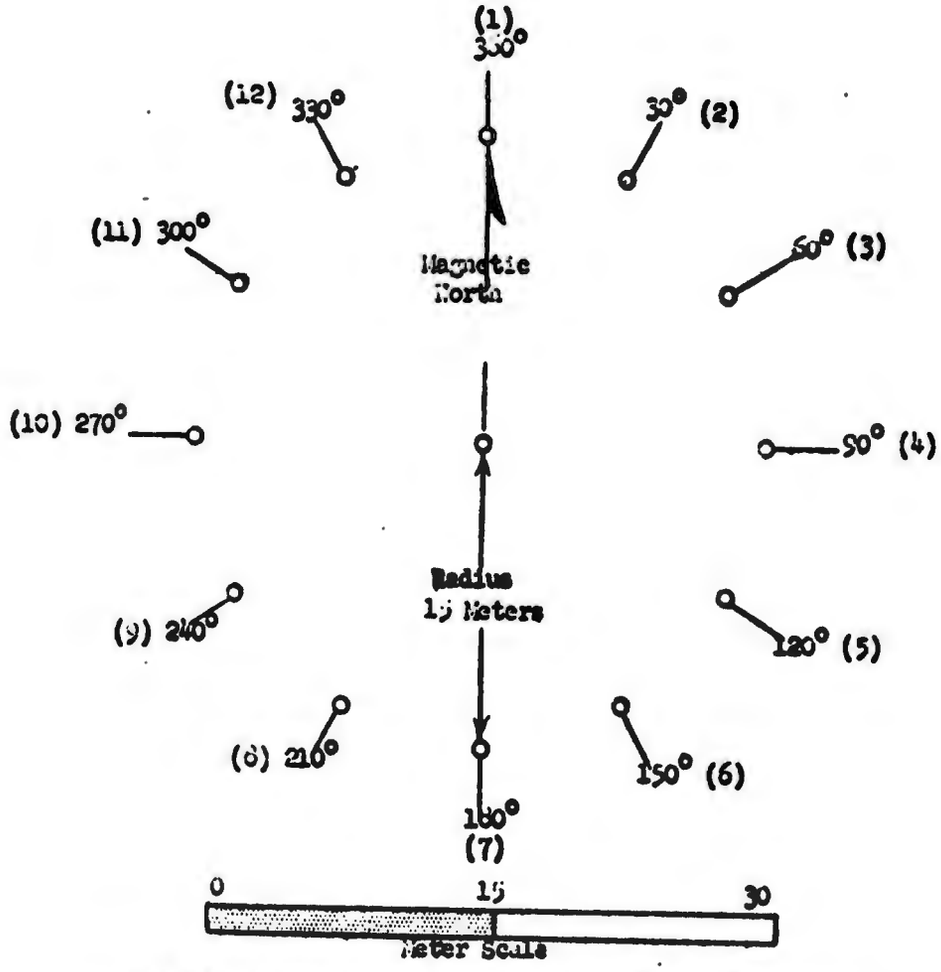


Fig 46. "Detailed Diagram of the Inner Starting Circle, Detouring," Period Two

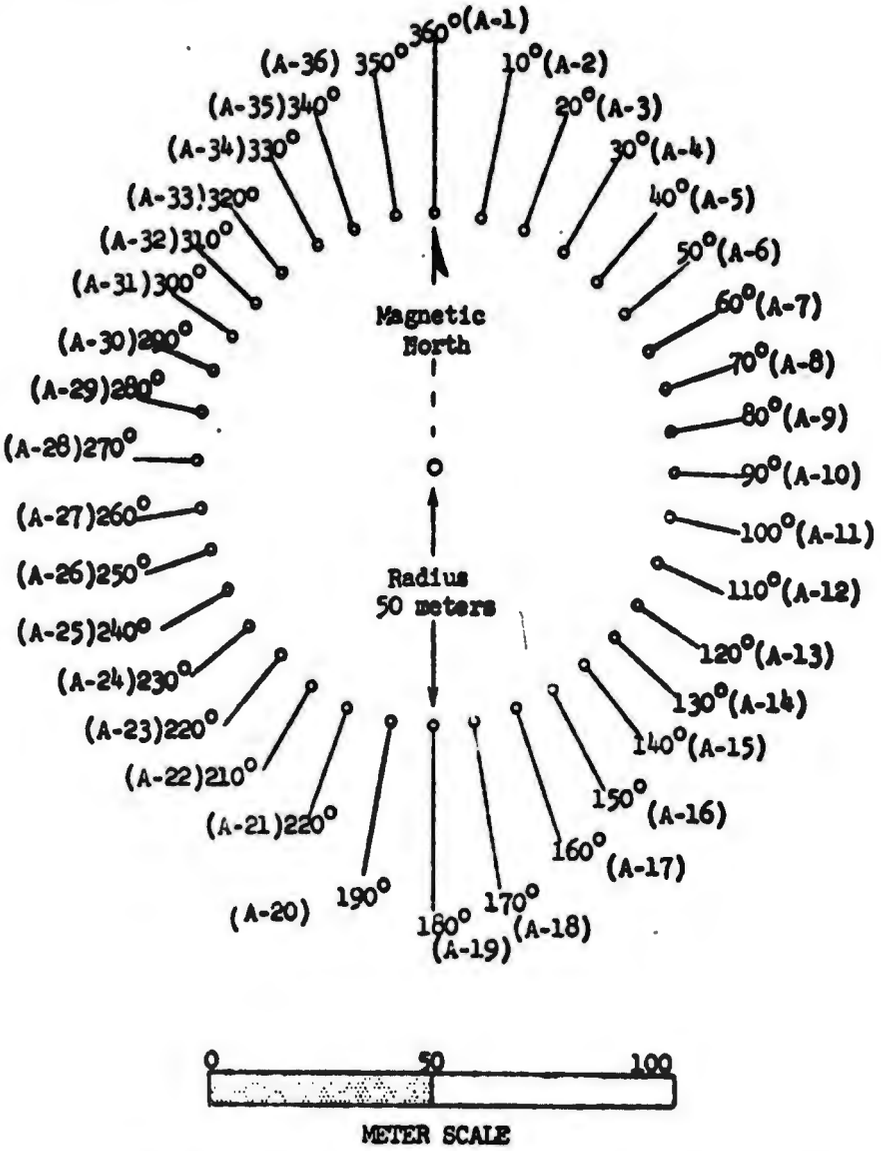


Fig 49. "Detailed Diagram of the 'A' Circle, Detouring," Period Two

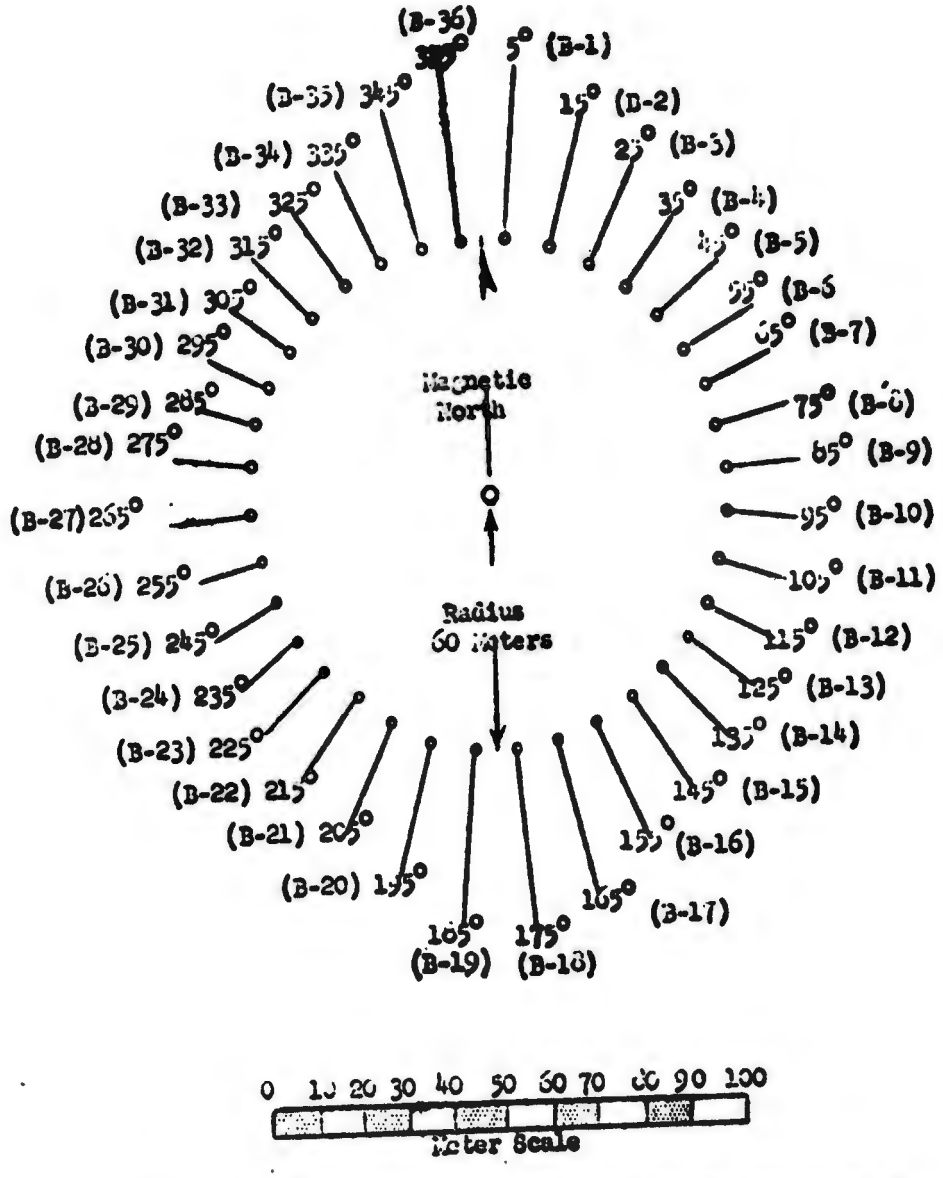


Fig. 50. "Detailed Diagram of the 'B' Circle, Detouring," Period Two

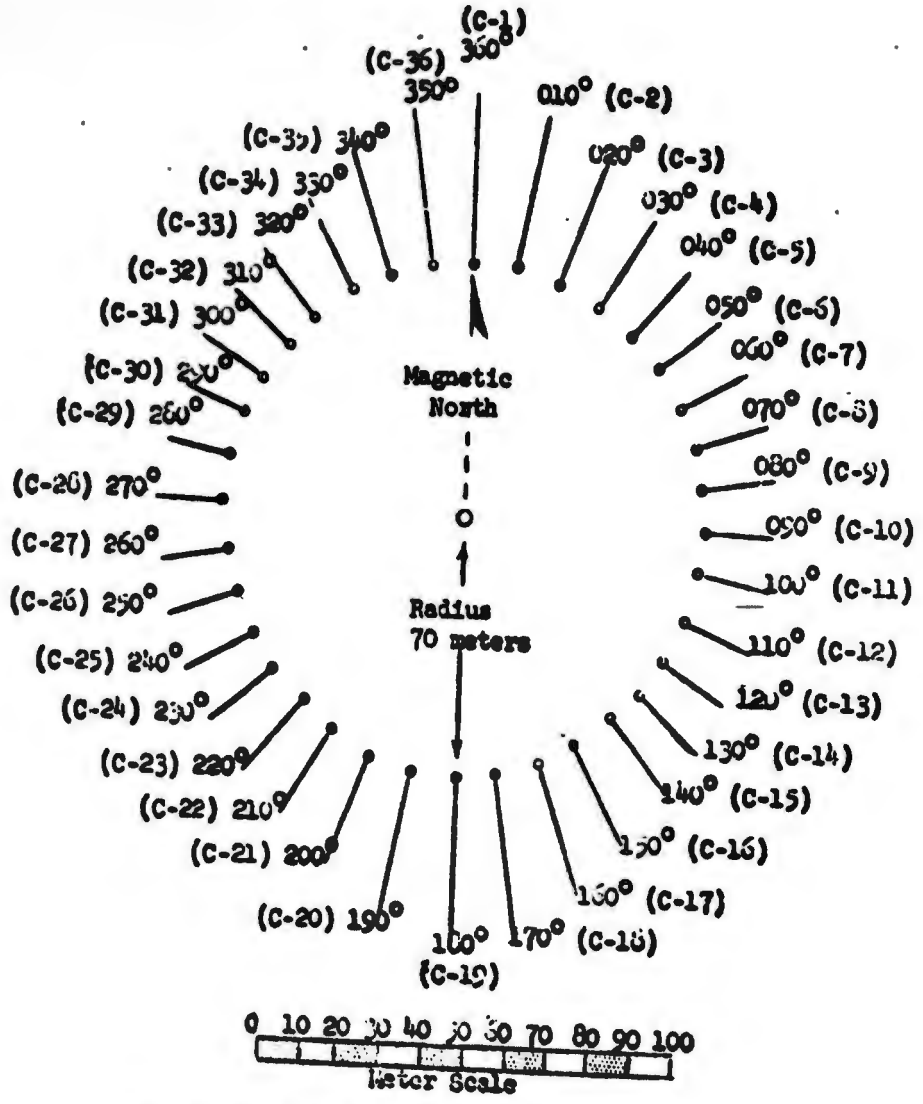


Fig 31. "Detailed Diagram of the 'C' Circle, Detouring," Period Two

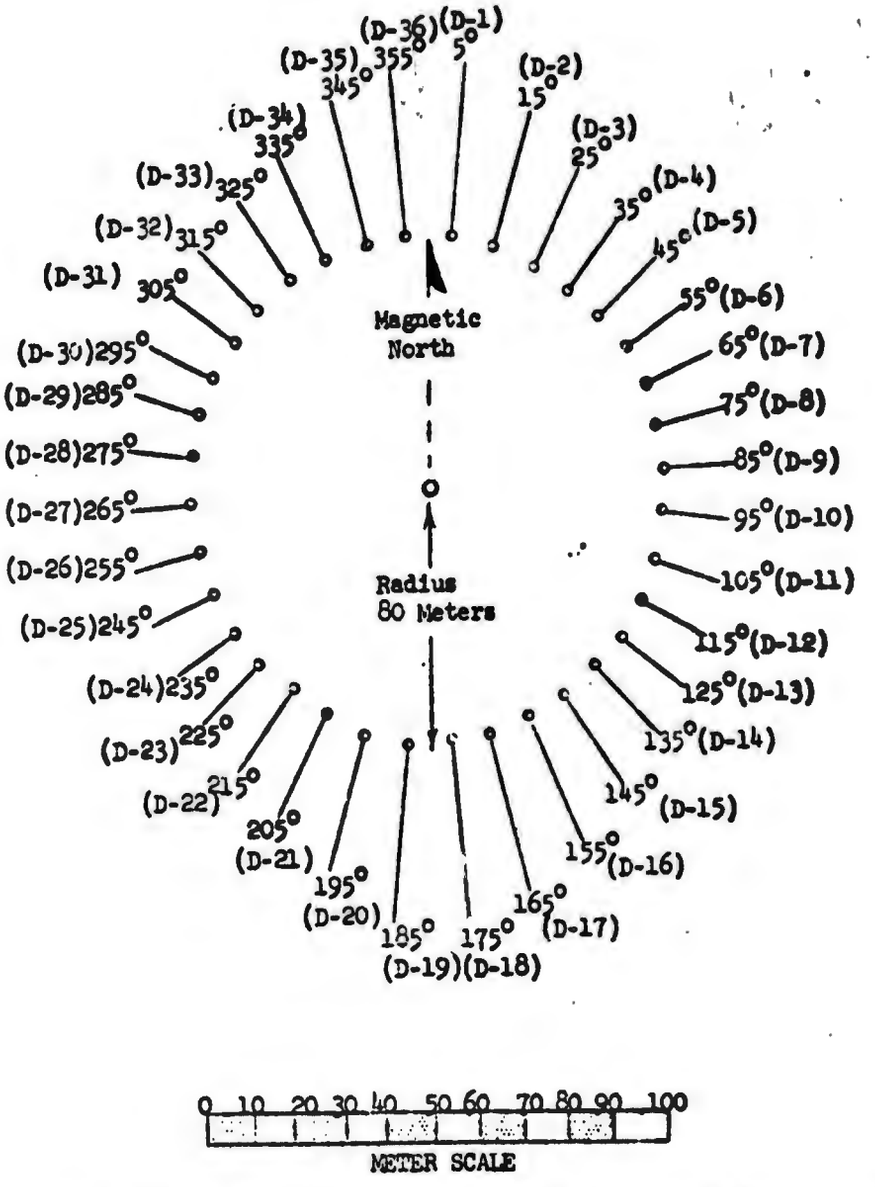


Fig 52. "Detailed Diagram of the 'D' Circle, Detouring," Period Two

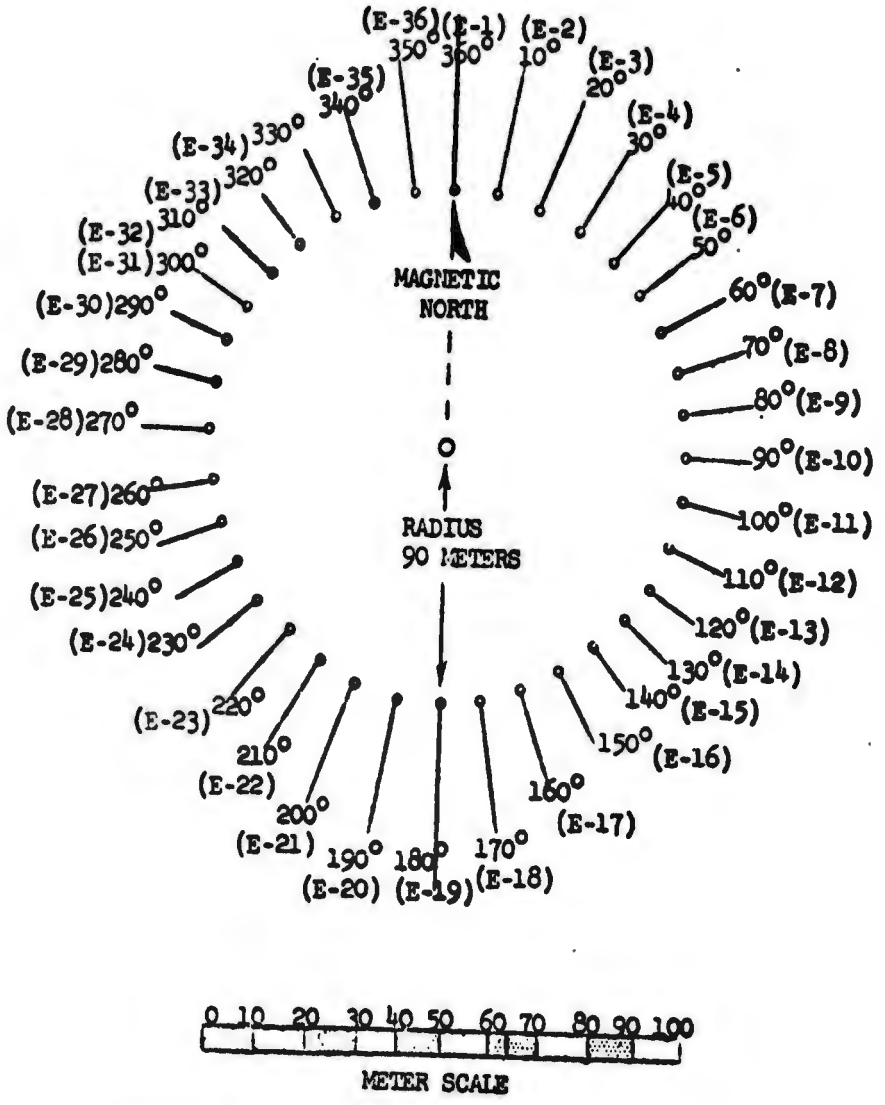


Fig 53. "Detailed Diagram of the 'E' Circle, Detouring Course," Period Two

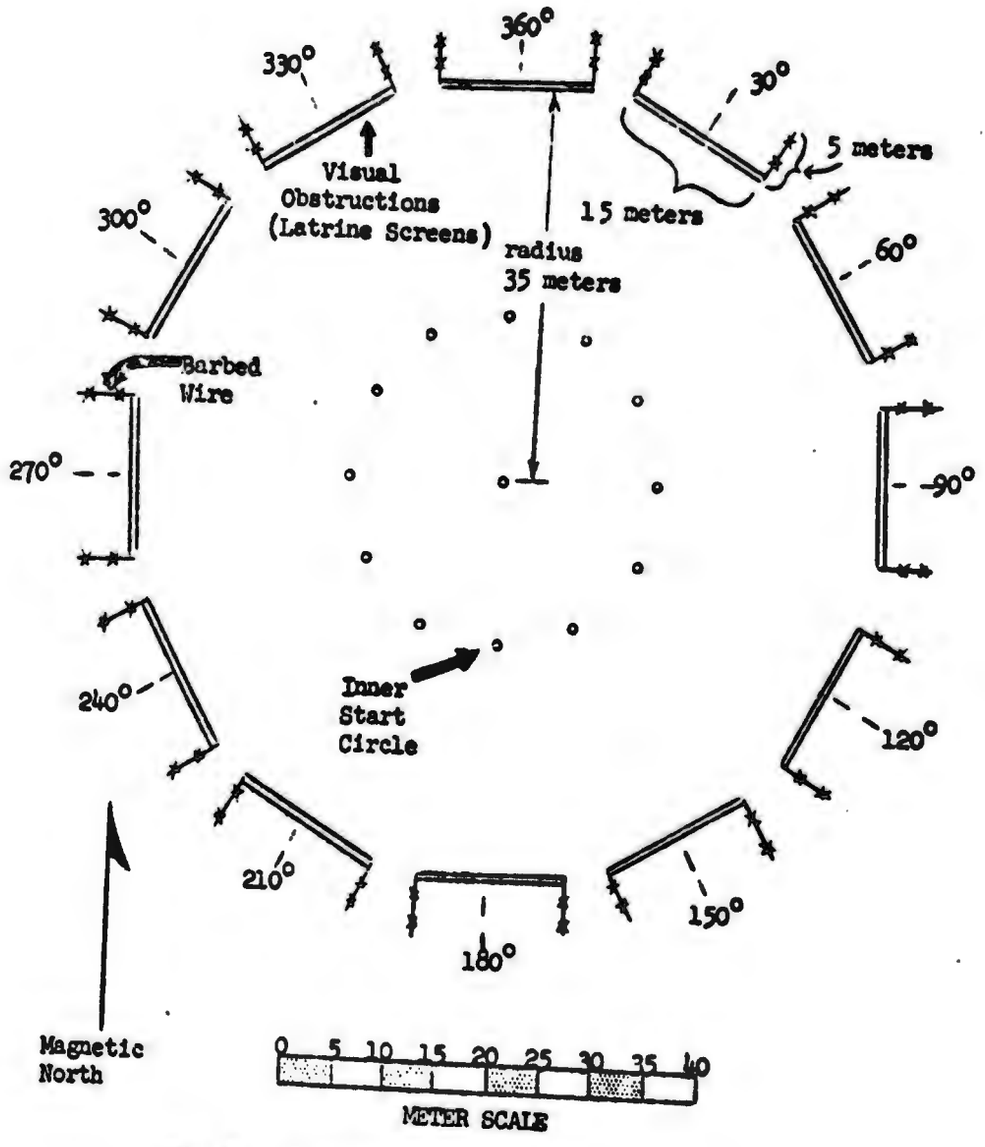


Fig 54. "Detailed Diagram of Obstructions, Detouring," Period Two

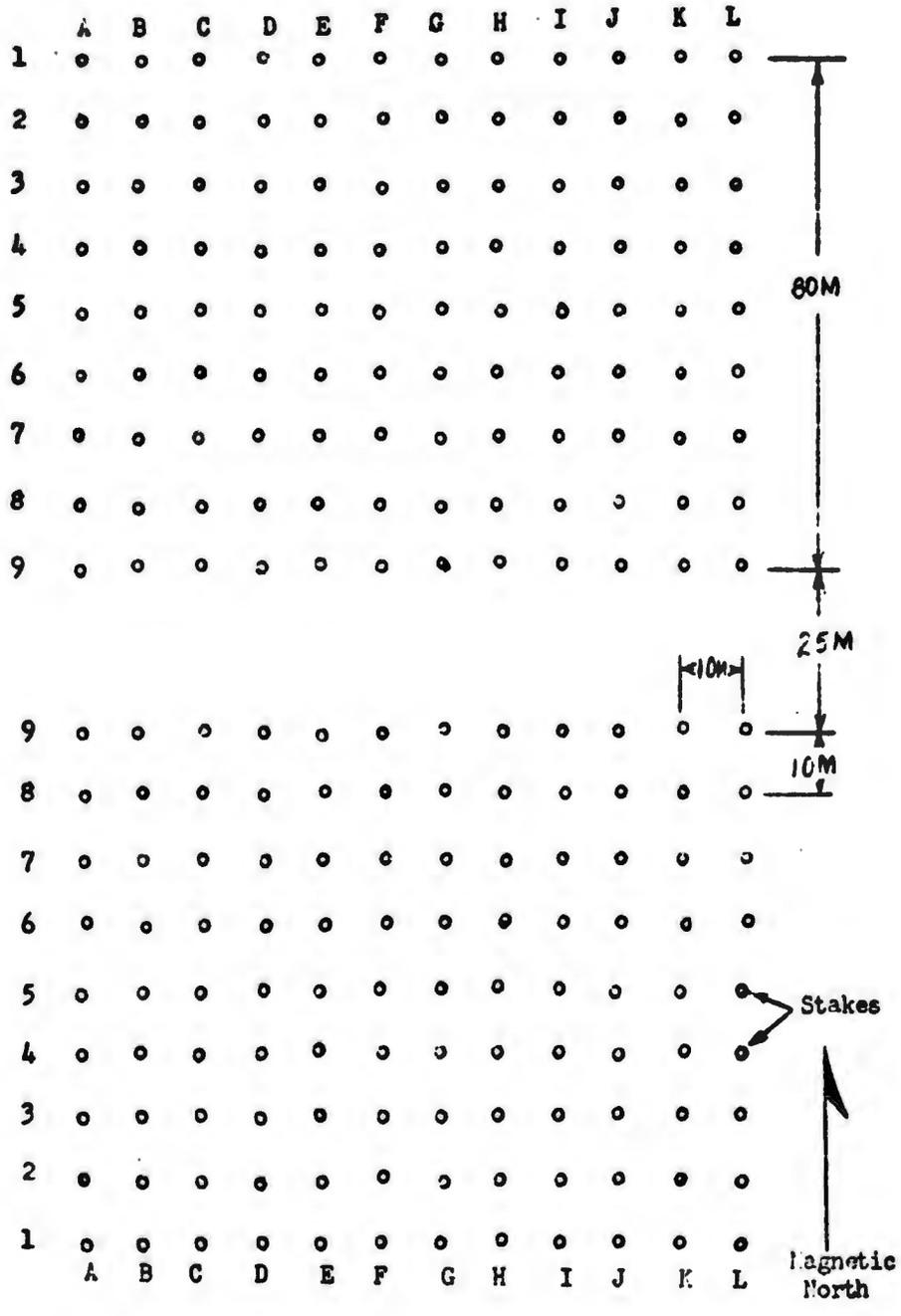


Fig 55. "Detailed Diagram, Dead Reckoning," Period Two

SECTION III

PERIOD THREE: MAP USING

No construction is required.

SECTION IV

PERIOD FOUR, MAP-TERRAIN ASSOCIATION

Description of Terrain Requirement

a. Training Area

(1) The route will be a closed traverse, somewhat circular in form. The total distance should not exceed 2,000 M to insure completion of period within scheduled time.

(2) A central point will be utilized for assembly and total group orientation.

(3) Trails must lead from this central assembly area to each of the eight checkpoints on the perimeter (see Fig. 29).

(4) Trails will connect each successive checkpoint.

(5) Each checkpoint will be marked by a numbered panel, ranging from numbers 1 to 8, consecutively. The panels must face the approach routes from previously visited checkpoints.

(6) The trails leading from the central area to the checkpoints must be marked. At the assembly area, a numbered panel will be placed on the trail to each checkpoint. The number is the same as the checkpoint number.

(7) The distance from central area to any checkpoint should not exceed 350M.

(8) Distances between checkpoints should be as nearly equal as the availability of suitable checkpoints will permit.

b. Checkpoint Choice

(1) The area chosen should afford eight checkpoints to include at least one each of the following: valley, hilltop, and ridge.

(2) The remaining five may be chosen from the following list, giving preference to natural terrain features over man-made or vegetation checkpoints:

(a) Spot type: hilltop, depression, building

(b) Line type: valley, stream, ridge, road, woodline

(c) Line and spot type: ridge and hilltop, building or hilltop by stream, road and hilltop, building by road, road and depression.

(d) Line end (or start): trail or road end, start or source of valley, end of ridge.

(e) Two-line type: stream fork, road and stream, cross-road, road and woodline, saddle.

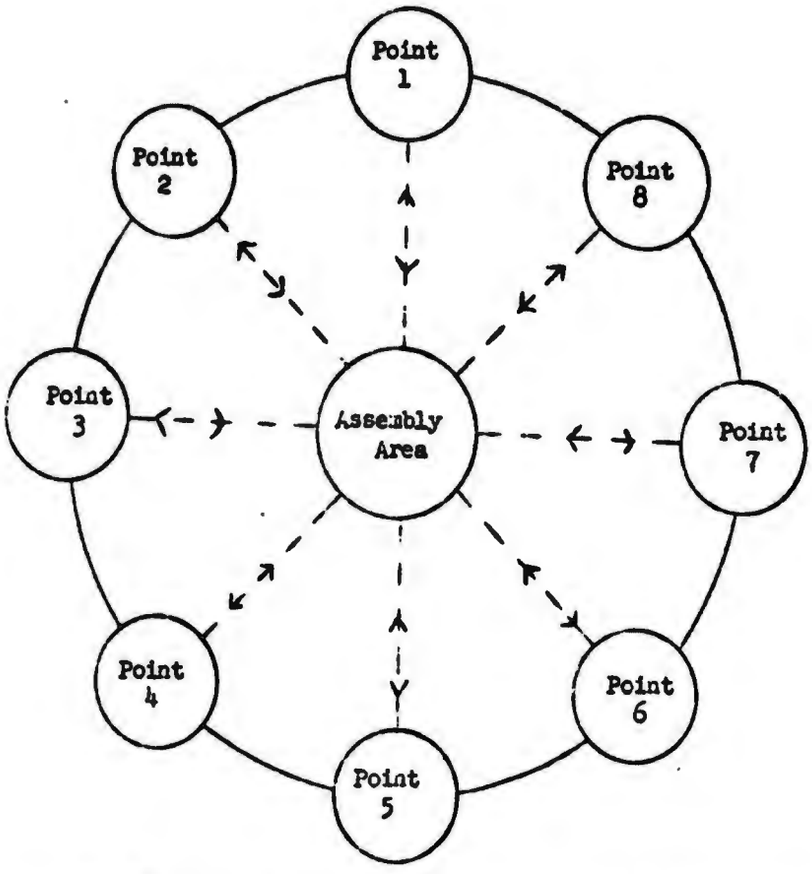


Fig 56. "Map Terrain Association Facility," Period Four. Diagrammatic sketch shows relationship between checkpoints and assembly area. All students assemble in central area, proceed in groups of ten to first checkpoint as shown by dashed arrow (group number and first checkpoint number coincide), and move as shown by solid arrows until they reach their initial checkpoint. At which time, they return to assembly area as shown by dashed arrow.

SECTION V

PERIOD FIVE N, NIGHT LAND NAVIGATION EXERCISE

1. Construction Diagram

Fig 57 shows construction details and layout for a three-lane, triangular facility wherein one center lane serves as a common starting lane and the two outer lanes provide separate routes to reduce density on second leg of course.

2. Terrain Requirements

Objectives (checkpoints) selected should be restricted to easily recognized terrain features to include the hilltop, saddle, stream fork, combined hilltop-ridgeline, and hilltop with immediately adjacent valley. Cultural features such as roads, trails, and buildings should be avoided. Routes selected should be perpendicular to nearby roads and trails to preclude possible use of such well-defined pathways to objectives. Assumption is made that only maps are available to students, and information and description of the ground furnished to students is based upon map analysis alone. No aerial photographs are employed to obtain information for student application. Emphasis throughout the course is to teach the student to dead reckon to the vicinity of an objective, then correct maximally using terrain recognition derived from map study. A "compass course" between two roads, for example, will not fulfill the desired teaching requirements and any temptation to select routes and "objectives" tending in this direction should be avoided. Locate three objectives (preferably hilltops with intervening valleys) on terrain that is alternately wooded and cleared or sparsely wooded throughout. Triangle formed by the three objectives should have approximately equal sides, each side ranging from 400-600 meters in length. An access road or trail and turn-around is required to permit delivery of troops by truck to vicinity of the initial starting points. Although the terrain should be characteristic of uninhabited countryside, dense brush, swamps, and other extremes of terrain should be avoided as detrimental to the over-all learning situation. Safety hazards such as abandoned wells, quicksand, undercut stream banks, and badly eroded areas, should be avoided or plainly marked with encircling smooth wire to preclude possible injury.

3. Description of Facility

a. Initial starting points are located approximately midway between the legs of the inverted V formed by lines drawn from the

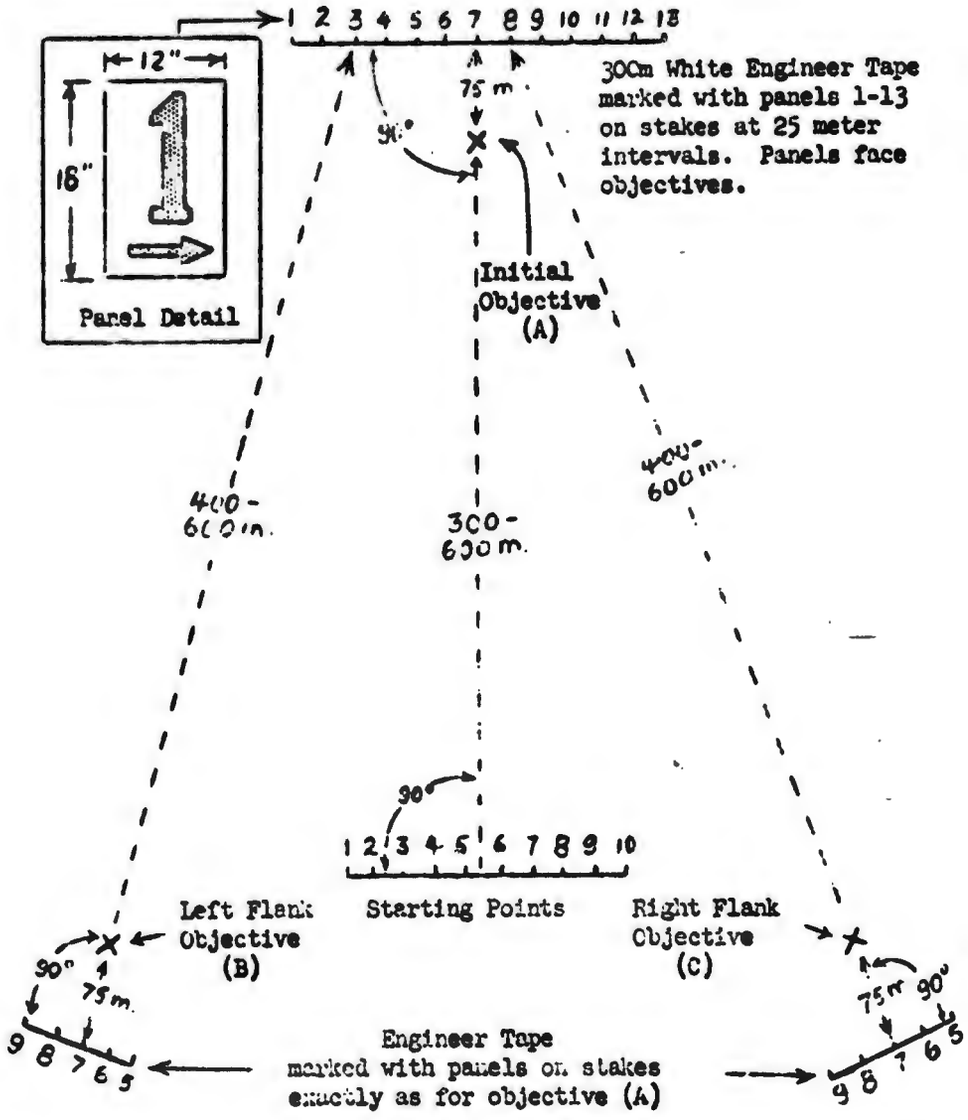


Figure 57. "Construction Details," Night Land Navigation Course, Period Five N. Distance, starting points to objective (A), may be varied to conform to time-distance requirements for the entire route. (Not to scale.)

initial objective (A) to the two flank objectives (B), (C). The lateral starting point line should be bisected by and approximately perpendicular to the initial outgoing lane, i.e., the line from the starting points to objective (A). The total distance to be navigated (both legs) may vary between 700-1200 meters depending upon difficulty encountered due to rough terrain. Approximately 70 minutes are allotted to navigation time. The first (common) leg from initial starting points to objective (A) is adjusted in length to insure conformation to the time limitation. Starting point panels, numbered 1-10, Type B, black numerals on white ground, are mounted on Type II stakes spaced 25 meters apart and connected with 225 meters of white engineer tape fastened to the top of the stakes.

b. Terminal lines are located 75 meters to the rear of all objectives and perpendicular to approaching center route. Each center approach route to the respective objective would, if extended, bisect its terminal tape line. Terminal panels are Type A, numbered 1-13, black numerals on white ground. Panels 1-7 bear heavy, horizontal arrows pointing to the right (facing the panel); panels 8-13 bear similar arrows pointing to the left (facing the panel). See inset, Fig 36, Two Typical Routes, Night Land Navigation Course. Panels are mounted on Type II stakes spaced 25 meters apart. Engineer tape fastened to the top of the stake forms the terminal barrier.

4. Construction Materials

The materials required for the construction of two triangular courses are listed in Tables VII, X, XI. In addition, a supply of temporary stakes are required for surveying and marking initial layouts. If the course is to be employed as a permanent training facility, commercial steel fence posts and stamped, enameled, metal panels may be employed in lieu of the wooden counterparts listed in reference table. Number 10 smooth steel wire or field communications wire may be substituted for engineer tape. Objectives should be marked with an inconspicuous iron pin and the locations accurately recorded on a map to be filed in the headquarters responsible for the training.

5. Field Survey and Layout Suggestions

a. Locate the three objective points, (A), (B), and (C) on the map and, after proper survey from an established reference (e. g., benchmark) set stakes marking the objectives on the ground.

b. Make a thorough reconnaissance of the area concerned to determine suitability of the routes and possible hazards to safety of personnel.

c. Determine, by foot reconnaissance, the time-distance factors for routes AB and AC. Based upon this obtained time, determine the length of the center route to permit negotiation of the course within the 70 minute time limit. This common center route should be established as near the center of the inverted V as the negotiability of the terrain permits, and must terminate at objective A.

d. Having established objectives A, B, C, and the center point of the initial starting point line, establish the initial starting point line perpendicular to the center route to objective A. Install the stakes, panels and tape as indicated in paragraph 3a, above.

e. Extend the line of the center route, from the midpoint of the initial starting line, through objective A and beyond objective A for a distance of 75 meters. This latter point will be the position of stake and panel number 7 as shown in the construction diagram.

f. Establish points 1-13 through point 7 and perpendicular to the line from objective A to point 7. Install stakes, panels, and tape as indicated by the construction diagram.

g. Establish a line from point 3 in rear of objective A to objective B and extend the line 75 meters to establish point 7 of the terminal tape line in rear of objective B.

h. Establish points 1-13 at 25 meter intervals through point 7 and perpendicular to the line from objective B to point 7. Install stakes, panels, and tape as indicated by the construction diagram.

i. Establish a line from point 8 in rear of objective A to objective C and extend the line 75 meters to establish point 7 of the terminal tape line in rear of objective C.

j. Establish points 1-13 at 25 meter intervals through point 7 and perpendicular to the line from objective C to point 7. Install stakes, panels and tape as indicated by the construction diagram.

k. Clear footpaths adjacent to all terminal tape lines on the objective side of the tape and to the full extent of the lines. Similarly, clear a footpath along initial starting point line on the side nearest the access trail. Brush removed on these footpaths should be cut off square, level with the ground, to minimize possible injury due to falls.

7. Tabulation of Azimuths and Distances

Since terrain and vegetation may dictate variations from the initial map plan, all distances and azimuths measured on the ground during layout and construction should be recorded and reported to the headquarters responsible for the training. This information provides the basis for determining azimuths entered on students' Route Information Cards and distances employed in critiques of student performance. No table of missions for Period Five N is included in this publication. Units administering the training must compile a table of missions based upon distances and azimuths pertinent to the terrain employed.

ADDENDUM

ADDENDUM

INSTRUCTOR'S GUIDE
PATROL I, LAND NAVIGATION
MAY 1958

General

The lesson plans contained in Instructor's Guide, PATROL I, Land Navigation: Basic Instruction, May 1958, were administered for the first time on 16-20 June 1958 at Fort Benning, Georgia.

On the basis of observations made by Human Research Unit personnel, and comments and suggestions by personnel of the U. S. Army Infantry School Ranger Department and Map and Individual Survival Training Committee, the following changes have been proposed. (Note: To expedite posting, many changes may be cut from these pages and glued directly into the appropriate section of the Instructor's Guide.)

Page 13, par 2: Add the following:

During construction and rehearsal, it may be desirable to construct hasty miniatures of the field physical facilities on sand tables or on the ground to facilitate rapid and complete understanding of the construction and employment of the field facilities. During rehearsal of Period Five N, use of a hastily constructed miniature facility proved worthwhile.

Page 21, par 2,C.(2)(c)

Add: "Some common items of equipment that will attract the magnetic bar are your helmet and rifle. The minimum safe distance for these items is one yard."

Page 33, par 2,d.(4)

Change: "If you have any difficulty, raise your hand."

To: "If you cannot determine why you were wrong, raise your hand and an AI will assist you."

Page 33, par 2.d.(4) (Note:)

Change: "AI's will assist any student who has difficulty in the AI's area of responsibility. The PI will pause to allow for individual critiquing by the AI's."

To: "AI's will assist any student who has raised his hand and signal the PI by raised hand when he has assisted all students in his assigned area. The PI will pause to allow for individual critiquing by the AI's and continue when all AI's have signalled that they have completed the critiquing."

Page 38 - Section PERSONNEL: 5th and 6th lines down:

Change: One AI per 14 students (Sec III)
One AI per 14 students (Sec IV)

To: One AI per 9 students (Sec III)
One AI per 9 students (Sec IV)

Page 45 - Section ORGANIZATION:

Change: "Entire group receives instruction simultaneously and files onto 100-meter lanes."

To: "Entire group receives instruction simultaneously. The PI then forms three equal groups, assigning one group to each of the 100-meter lanes."

Page 46 - par 2e

Change: "The first course traversed . . . "

To: "One course to be traversed . . . "

Page 52, par 1e

Add to end of sentence, " . . . 'moderate ground' or 'rough ground,' depending on which particular lane you have traversed."

Page 52, par 1.h.

Delete in first sentence, " . . . marked 'Moderate Ground' . . ."

Page 52, par 1.i.

Delete: " . . . marked 'Rough Ground' . . . "

Page 52, par 2.

Add: "(Note: AI handling the conversion teble at the end of each lane will station himself approximately 10 meters beyond the end of the lane to prevent accumulation of students on the lane waiting to report.)"

Page 53 - SECTION IV - APPLYING THE STANDARD

Change: "(Note: AI's will assemble groups of 8 men as they complete the previous course, and render the following briefing.)"

To: "(Note: PI will assemble entire group as it completes the previous course, and render the following briefing.)"

Page 53 - Section ORGANIZATION:

Change: "Students will be equally distributed over four starting points as they complete the course 'Determining the Individual Standard.'"

To: "Students will be equally distributed over four starting points after receiving instructions from the PI."

Page 54, par 1.c.

Underline entire paragraph.

Page 54, par 1.e.

Underline entire paragraph. Add to end of sentence, " . . . and bring it to the nearest AI."

Page 54, par 1.f.

Change: "An AI . . . "

To: "The AI . . . "

Page 54, par 2.

Add: "(Note: Two AI's will be stationed at the stake group at the end of each 100 meters. Again, they will station themselves about 10 meters from the side of the lane to prevent jamming.)"

Page 55, par 1.d. - second sentence

Change: "An AI will then take your scorecard and tell you whether you landed correctly or long, short, right, or left."

To: "Report immediately to an AI who will score you and tell you whether you landed correctly or long, short, right, or left."

Page 61

Add to each reference to either "U's" or "V's" the corresponding one omitted, i.e., all references should read, " . . . the "U" or "V" shaped contours . . . " This addition occurs on the following pages:

Page 61, par 2.e.(1)
Page 61, par 2.e.(2)
Page 61, par 2.e.(3)
Page 62, par 2.f.
Page 62, par 3.a.(2)
Page 62, par 3.b.(1)
Page 64, par 4.a.(4)(b)
Page 69, par 7.b.(3)
Page 69, par 7.b.(4)

Page 61, par 2.b., after (6)

Add (7): "If you find unfamiliar symbols on a map, you may refer to the legend usually found on the bottom left-hand margin of the map for clarification."

Page 61, par 2.c.(1)

Add: "Normally, every fifth contour line is made heavier than the others and is numbered to show the height measured from sea level. These heavy lines are known as 'index contours' and will aid in determining high and low ground."

Page 61, par 2.d.(1)

Add: "A hill is a natural terrain elevation where the ground slopes down on all four sides."

Page 61, par 2.e.(1)

Add: "A valley is a natural terrain depression in which the ground slopes up on three sides and down on one."

Page 61, par 2.e.(3)

Add: "(d) Reference to the relative heights of the index contours."

Page 62, par 2.f.

Add: "A ridge is a natural terrain elevation where the ground slopes down on three sides and up on one."

Page 63, par 4.a.(1)

Change term "ground form" to "terrain feature".

Page 63, par 4.a.(2)

Change term "ground form" to "terrain feature".

Page 63, par 4.a.(3)

Change term "forms" to "features".

Par 64, par 4.a.(4)

Change term "ground forms" to "terrain features".

Page 78, after par 12.f.

Add to Note: "Pivot point method of map orientation may be deleted and the following method substituted when the removal of the "P" point has been implemented in all Army maps.

a. Place the map on the ground face up, place compass on the map and line up compass with sight wire along N-S grid line.

b. Rotate compass and map until compass North arrow is lined up with sight wire and grid line and pointing to top of the map.

c. Move the map so that the compass North arrow will be in the same relative position to the N-S grid line as the magnetic North line is to the grid North line on the declination diagram, maintaining the given number of degrees of declination on the map used.

d. Round off the declination degrees to the nearest five degrees.

e. The map is now oriented."

Page 89, TRAINING AIDS. Per AI (Starting Points and Final Objectives)

Add: "Black camouflage paint or burnt cork and sufficient string for trouser leg and sleeve ties.

(NOTE: Camouflage paint and clothing ties are applied by all students prior to entrucking for the training area. AI's will wear no camouflage so the students may draw a comparison between their camouflaged buddies and the AI's. AI's are responsible for calling this difference in appearance to the attention of the students.)"

Page 92

Add the following to first NOTE appearing on this page:

"Where the total time available in one evening is not critical for the training of a given number of troops, a total of four orders, each spaced 10 minutes apart, may be dispatched over each course. However, the interaction among students probably increases with increase in student density, and the number of AI's employed at each objective must be doubled to prevent jamming at critique points. A saving results in terrain, material, and construction time. Dispatch of more than four orders was not attempted during the experimental training.)"

Page 97, par 3

Add subparagraph d. to read as follows:

"d. On dispatch of the last order, AI's Nr 1 and Nr 2 will remove the panels and tape from the starting point line for the benefit of disoriented students enroute from Objective "A" to either of the flank objectives. Although the starting point line is not astride the routes concerned, disoriented students might waste time searching for an AI in the vicinity of the starting point, thinking they had encountered the terminal line behind a flank objective."

Page 102, NOTE:

Add to Note - "Supplementary sketches may also be found beginning on page 247."

Page 103, par 2. Chart Production

Add: "All charts will be enclosed in an acetate covering for protection during inclement weather."

Page 104, par 4.a.(1)

Add: "(Note: Keeping the compass and compass pouch dry during wet weather is the best way to prevent condensation on the glass. If the compass does become wet, it should immediately be dried and placed in a dry pouch or pocket after use. If condensation does occur, it can be removed by applying friction to the glass by rubbing or subjecting the compass to a short period of low heat.)"

Page 113, par 2

Add: "c. The scorecards used are printed with waterproof ink and the necessary entries made in grease pencil to prevent running or smearing in wet weather."

Page 141, Fig. 22

Insert corrected copy of Fig. 22.

Page 147, Table IV

Insert corrected copy of Table IV.

Page 148, Table IV (cont'd)

Insert corrected copy of Table IV (cont'd)

Page 149, Table IV (cont'd)

Insert corrected copy of Table IV (cont'd)

Page 152, under II-4 - Contour Indicates Slope

Add: "Middle contour line in each view is thicker, and marked with a number, to represent an index contour."

Page 154, II-11 - DRILL

Change: "Which one of the following ground forms . . . "

To: "Which one of the following terrain features . . ."

Page 166, Fig. 30 (#3 under (3) - Appearance and Clarity)

Change: "Ground slopes down on three sides and up on one side."

To: "Ground slopes up on three sides and down on one side."

Page 167, Fig. 31 (#6 under (3) - Appearance and Clarity)

Change: "Ground slopes down on three sides and up on one side crossed by cut."

To: "Ground slopes up on three sides and down on one side crossed by cut."

Page 171, par 2 - Briefing Maps

Add: "Markings on maps should be executed in black lead pencil. Use of red map markings should be avoided because such markings are difficult or impossible to read when illuminated by a red-shielded flashlight."

Page 172, Fig. 34

Delete and substitute CORRECTED copy of scorecard. As in all mimeographed scorecards, the use of water solutle mimeograph ink will give unsatisfactory results in inclement weather, as will the use of ink for entries on the recording side of the Route Information Card.

Page 173, Fig. 35

Add: "Entries should be made in lead pencil. Ink tends to smear in inclement weather."

Page 174, Fig. 36

Add the following to the description of Fig. 36: "If employed outdoors, this chart should be weatherproofed by covering with acetate or executed in oil paint on light marine plywood to preclude damage during inclement weather. Use of plywood backing also decreases the likelihood of damage during movement and repeated employment."

Page 181, par 1

	Total
Change: "Identifying panel (Type A) 'Land Navigation'"	1
To: "Identifying panel (Type A) 'Land Navigation'"	2
Change: "4 copies, series 1 through 7, with arrow under number pointing <u>right</u> (Panel Type A)"	28
To: "6 copies, series 1 through 7, with arrow under number pointing <u>right</u> (Panel Type A)"	21
Change: "4 copies, series 8 through 13, with arrow under number pointing <u>left</u> (Panel Type A)"	24
To: "6 copies, series 8 through 13, with arrow under number pointing <u>left</u> (Panel Type A)"	18
Change: "Grand Total"	73
To: "Grand Total"	90

Page 182, Table VII

Line "Period Five N, 'Land Navigation'" -

Under Type A, change 53 to 80.
Under Type B, change 20 to 10.
Under "Total", change 73 to 90.

Line "Grand Total" -

Under Type A, change 124 to 151.
Under Type B, change 555 to 545.
Under"Total", change 679 to 696.

Page 184 - TYPE A PANELS

Under first column "Nr of Panels" -

Change: All 4's
To: All 6's

Page 184 - Under 2d column labeled "Front" and "Nr of Panels"

Change:	Land Navigation	1
To:	Land Navigation	2

Page 184 - Add to Note:

"One complete set of 13 panels is required for each objective. Since each course has three objectives, two courses will require six complete sets. The LAND NAVIGATION signs may be installed on Type I stakes between starting point numbers 5 and 6."

Page 192, Table X (cont'd)

Line "Period Five II, 'Land Navigation'"

Under Type I, change 1 to 2.
Under Type II, change 20 to 98.
Under "Total", change 21 to 100.

Line "Grand Total" -

Under Type I, change 111 to 112.
Under Type II, change 519 to 568.
Under "Total", change 630 to 678.

Page 193, par 1.d.

Add: "Stakes should be placed in the ground to a depth of 24 inches."

Page 197, Fig. 39

Change: "(GG-12) 330°"

To: "(GG-16) 330°"

Page 228, par 3.a.

Change last sentence to read as follows:

"Starting point panels, numbered 1-10, Type B, black numerals on white ground, are mounted on Type II stakes spaced 25 meters apart and connected with 225 meters of white engineer tape fastened to the stakes 24 inches above the ground. (NOTE: On dispatch of the last order, panels and engineer tape should be removed from the stakes at the starting points. Although not astride the prescribed routes, the possibility exists that some disoriented students may blunder into the starting point marking tape and confuse this location with that of the final objectives. Starting point tape and panels must be replaced prior to next employment of the course. Installation of engineer tape above 24" from the ground encourages the students to use it as a "hand rail", increasing the possibility of breakage. If the tape is installed at ground level, it quickly becomes discolored by muddy boots during inclement weather and is rendered useless as a guide at night.)"

Page 228, par 3.b.

Change the last sentence to read as follows:

"Engineer tape fastened to the stakes 24" above the ground forms the terminal barrier."

"Note: Prior to each employment of the course, PI must cause an inspection to be made to insure proper placement of all panels and/or broken or discolored tape.)"

CORRECTED COPY (Page 141)

SCORING KEY, DETOURING, PERIOD TWO
(First Quadrant)

START Stake		OBJECTIVES
Twelve	12-1	C-33
	12-2	D-33
	12-3	B-33
	12-4	C-34
	12-5	B-34
	12-6	D-34
	12-7	C-35
One	1-1	C-36
	1-2	D-36
	1-3	B-36
	1-4	C-1
	1-5	B-1
	1-6	D-1
	1-7	C-2
Two	2-1	C-3
	2-2	D-3
	2-3	B-3
	2-4	C-4
	2-5	B-4
	2-6	D-4
	2-7	C-5
Three	3-1	C-6
	3-2	D-6
	3-3	B-6
	3-4	C-7
	3-5	B-7
	3-6	D-7
	3-7	C-8
Four	4-1	C-9
	4-2	D-9
	4-3	B-9
	4-4	C-10
	4-5	B-10
	4-6	D-10
	4-7	C-11

Fig. 22. "Sample Face of Scoring Key, First Quadrant, Detouring," Period Two.

CORRECTED COPY (Page 147)

TABLE III (continued)

MISSIONS, MAINTAINING DIRECTION WHILE MOVING, PERIOD TWO

SECOND STUDENT

From Number	Sight at	Objective
29	255	Z-38
30	10	KK-37
31	275	BB-31
32	30	B-43
33	295	DD-29
34	50	D-9
35	315	FF-21
36	70	F-6
THIRD STUDENT		
6	150	N-3
12	85	I-42
18	145	O-8
24	205	U-4
30	265	AA-41
36	325	GG-23

TABLE IV

MISSIONS, DETOURING, PERIOD TWO

START STAKE		DEGREES	METERS	OBJECTIVE
One	1-1	350	55	C-36
	1-2	355	65	D-36
	1-3	355	45	B-36
	1-4	360	55	C-1
	1-5	5	45	B-1
	1-6	5	65	D-1
	1-7	10	45	C-2
Two	2-1	20	55	C-3
	2-2	25	65	D-3
	2-3	25	45	B-3
	2-4	30	55	C-4
	2-5	35	45	B-4
	2-6	35	65	D-4
	2-7	40	55	C-5

CORRECTED COPY (Page 148)

TABLE IV (Continued)

MISSIONS, DETOURING, PERIOD TWO

START STAKE		DEGREES	METERS	OBJECTIVE
Three	3-1	50	55	C-6
	3-2	55	65	D-6
	3-3	55	45	B-6
	3-4	60	55	C-7
	3-5	65	45	B-7
	3-6	65	65	D-7
	3-7	70	55	C-8
Four	4-1	80	55	C-9
	4-2	85	65	D-9
	4-3	85	45	B-9
	4-4	90	55	C-10
	4-5	95	45	B-10
	4-6	95	65	D-10
	4-7	100	55	C-11
Five	5-1	110	55	C-12
	5-2	115	65	D-12
	5-3	115	45	B-12
	5-4	120	55	C-13
	5-5	125	45	B-13
	5-6	125	65	D-13
	5-7	130	55	C-14
Six	6-1	140	55	C-15
	6-2	145	65	D-15
	6-3	145	45	B-15
	6-4	150	55	C-16
	6-5	155	45	B-16
	6-6	155	65	D-16
	6-7	160	55	C-17
Seven	7-1	170	55	C-18
	7-2	175	65	D-18
	7-3	175	45	B-18
	7-4	180	55	C-19
	7-5	185	45	B-19
	7-6	185	65	D-19
	7-7	190	55	C-20

CORRECTED COPY (Page 149)

TABLE IV (continued)

MISSIONS, DETOURING, PERIOD TWO

START STATE		DEGREES	METERS	OBJECTIVE
Eight	8-1	200	55	C-21
	C-2	205	65	D-21
	8-3	205	45	B-21
	8-4	210	55	C-22
	8-5	215	45	B-22
	8-6	215	65	D-22
	8-7	220	55	C-23
Nine	9-1	230	55	C-24
	9-2	235	65	D-24
	9-3	235	45	B-24
	9-4	240	55	C-25
	9-5	245	45	B-25
	9-6	245	65	D-25
	9-7	250	55	C-26
Ten	10-1	260	55	C-27
	10-2	265	65	D-27
	10-3	265	45	B-27
	10-4	270	55	C-28
	10-5	275	45	B-28
	10-6	275	65	D-28
	10-7	280	55	C-29
Eleven	11-1	290	55	C-30
	11-2	295	65	D-30
	11-3	295	45	B-30
	11-4	300	55	C-31
	11-5	305	45	B-31
	11-6	305	65	D-31
	11-7	310	55	C-32
Twelve	12-1	320	55	C-33
	12-2	325	65	D-33
	12-3	325	45	B-33
	12-4	330	55	C-34
	12-5	335	45	B-34
	12-6	335	65	D-34
	12-7	340	55	C-35

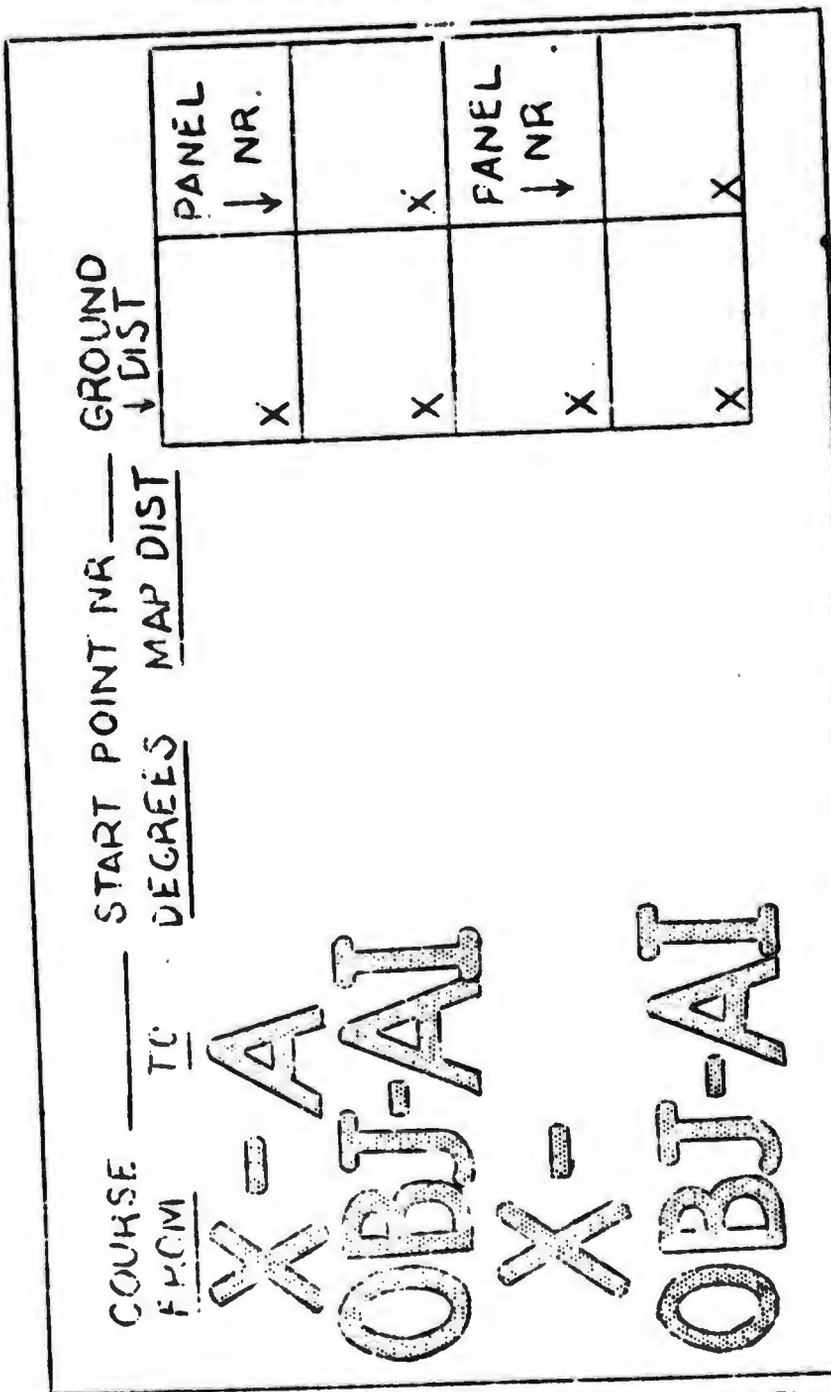


Figure 34. "Face of Route Information Card, Period Five N. Entries for students must be made by hand in black grease pencil to be read at night without artifical light.

CORRECTED COPY

FILM SLIDE REQUIREMENT

SUPPLEMENTARY SKETCHES

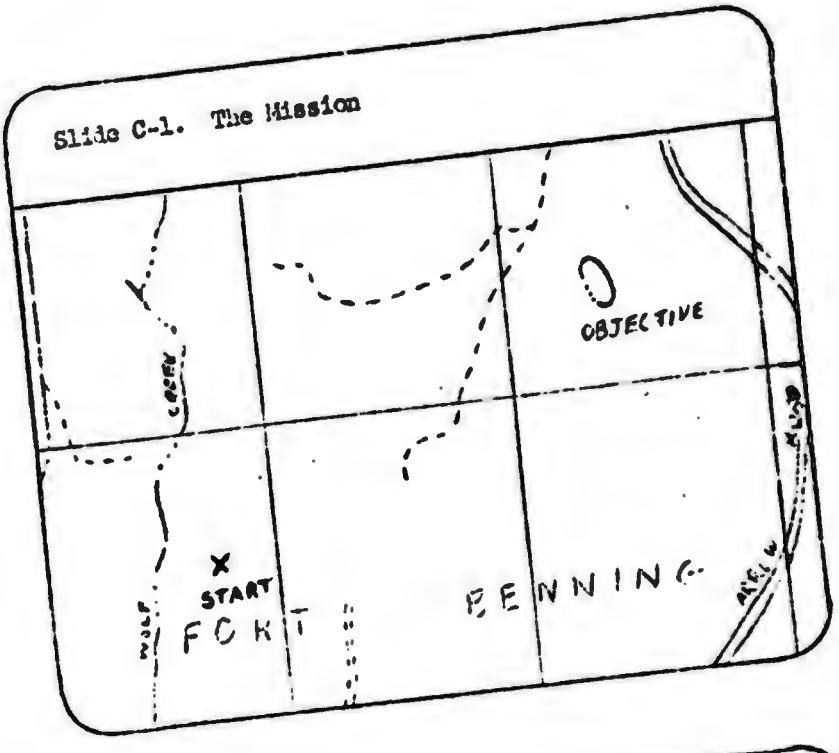
SEPTEMBER 1958

The enclosed sketches represent the film slide training aids employed during the experimental run of PATROL I, Land Navigation: Basic Instruction, May 1958.

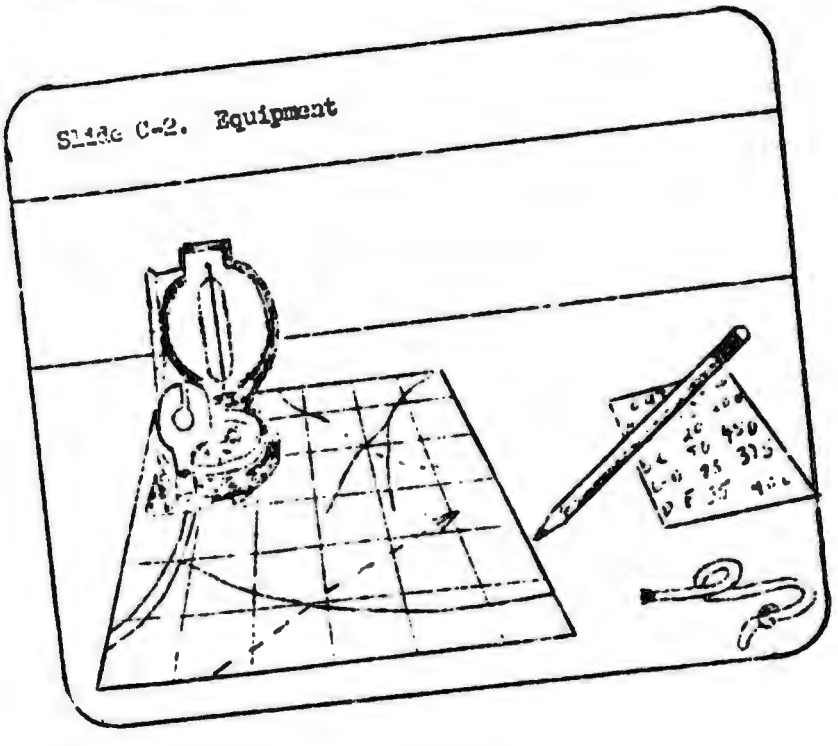
The slides depicted are 4x5 inches in size and projected by overhead projector (PH637 "Master Vu-Graph") 1000 watt. The index letters in the top, left-hand corner of the frames represent that period of instruction in which the slide is presented (i.e., C = Compass Training, Period One; M = Map Training, Period Three). The index numbers represent the order of presentation of the slides within the period.

Written descriptions of the slides for Period One appear in Instructor's Guide, PATROL I, Land Navigation: Basic Instruction, May 1958, beginning on page 106, and for Period Three beginning on page 153.

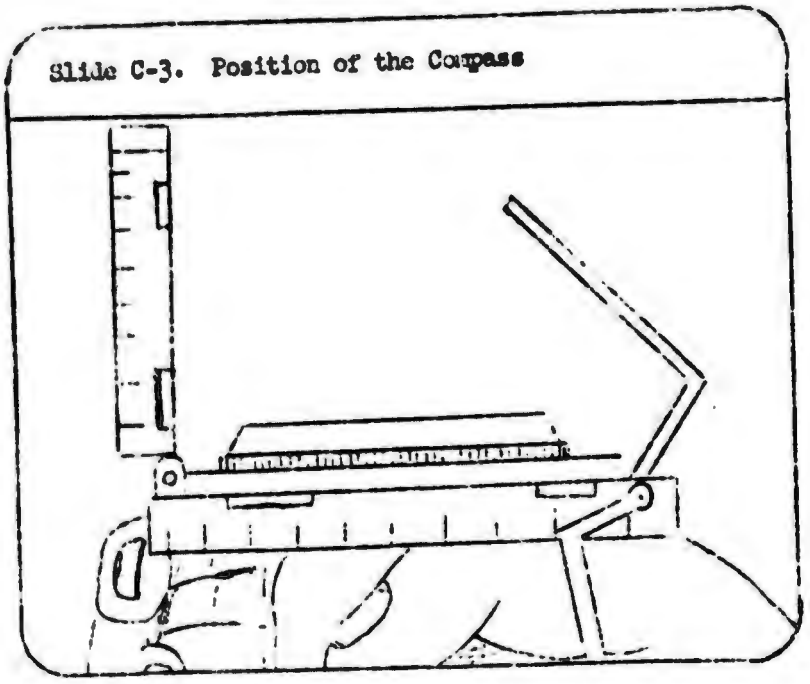
Slide C-1. The Mission



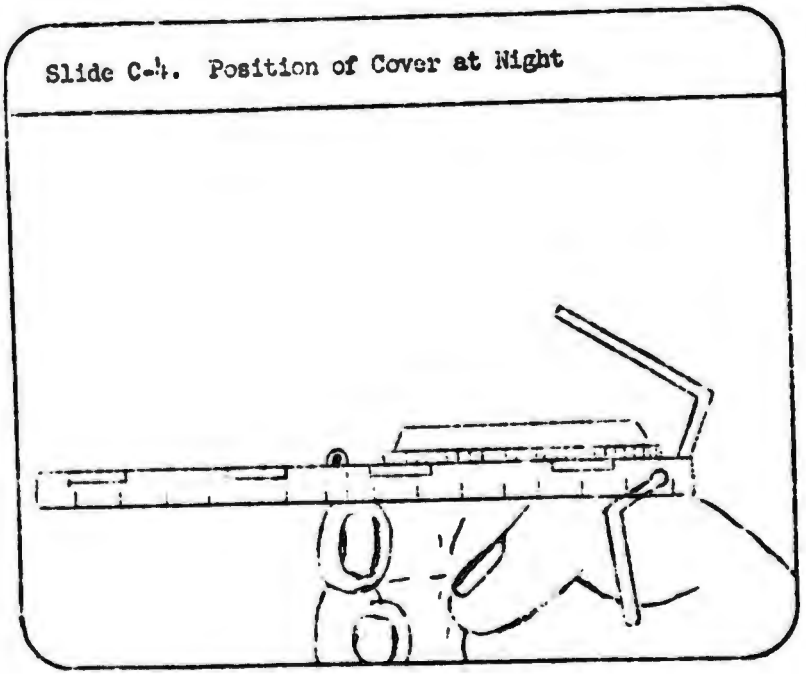
Slide C-2. Equipment



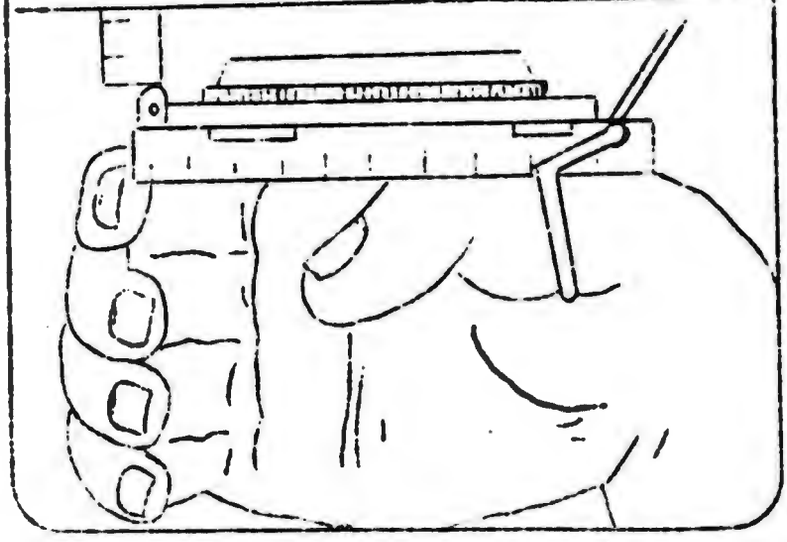
Slide C-3. Position of the Compass



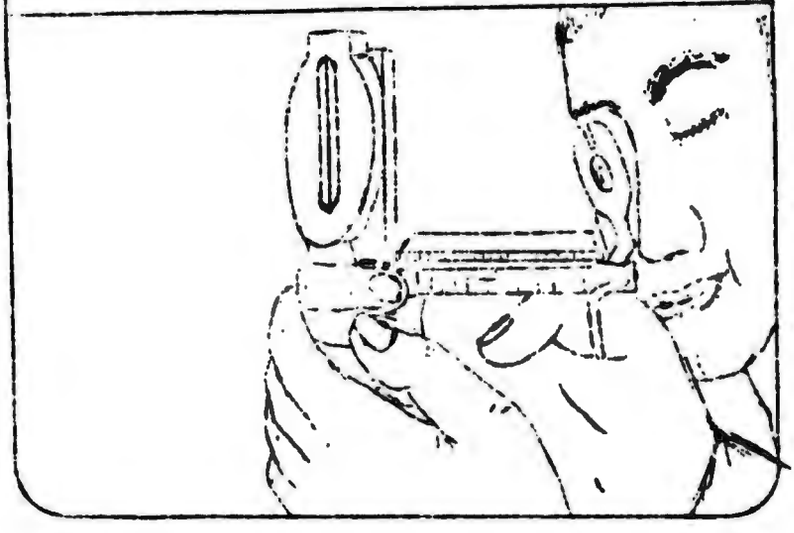
Slide C-4. Position of Cover at Night



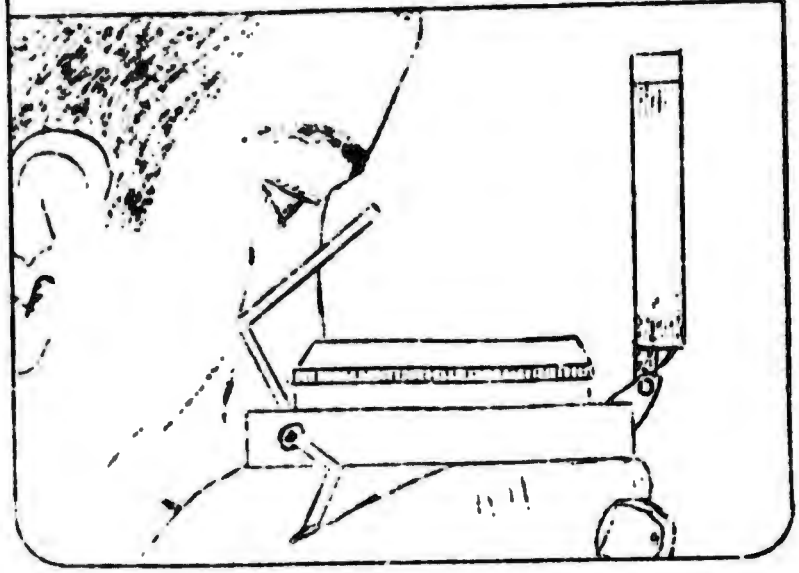
C-5. Position of the Hand



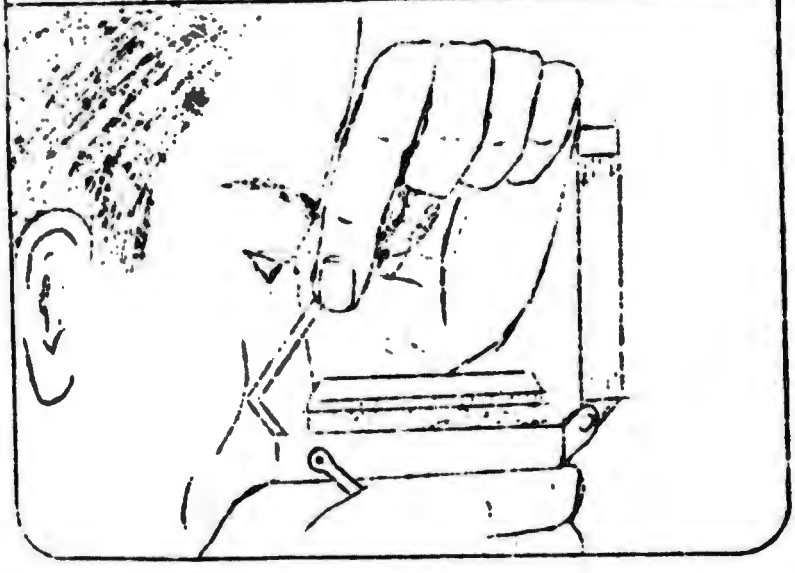
Slide C-6. Position of Free Hand



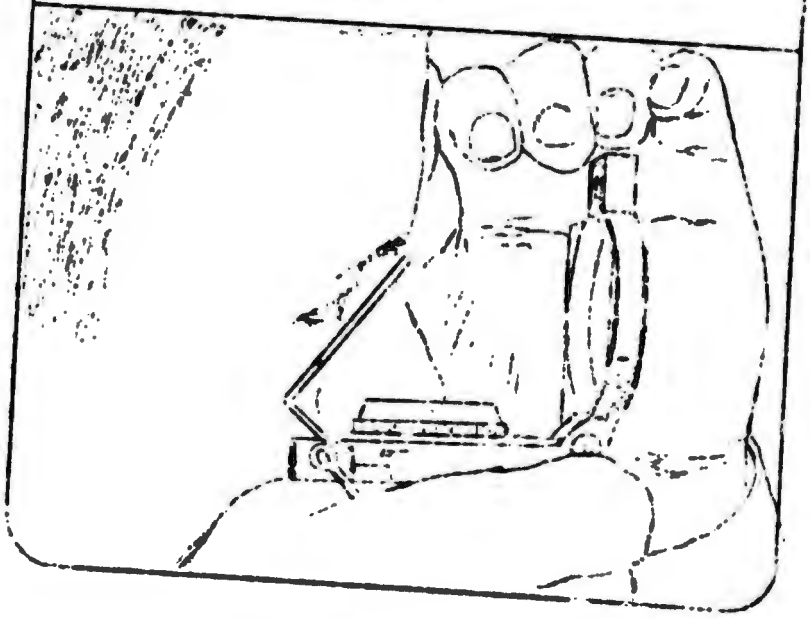
Slide C-7. Eye Piece Placed Close to Eye



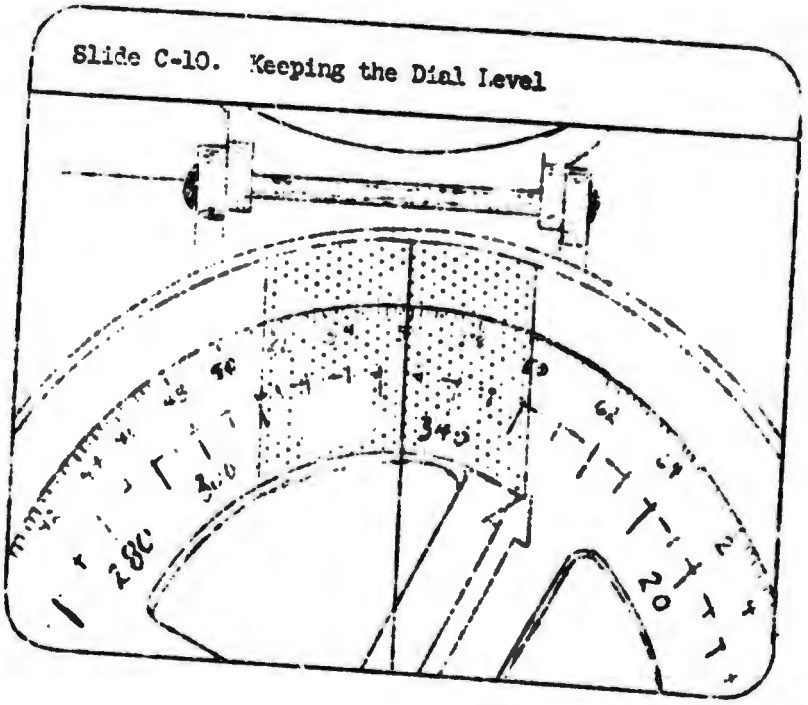
Slide C-8. Focusing the Reading Glass



Slide C-9. Reducing Glare

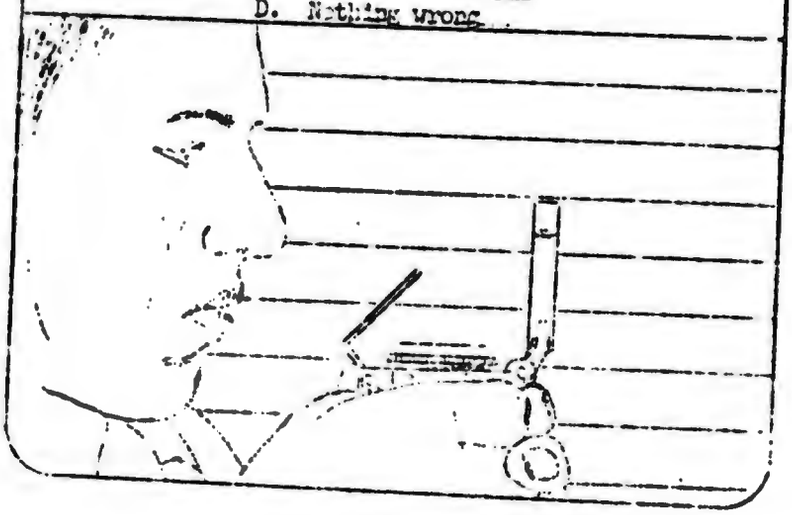


Slide C-10. Keeping the Dial Level



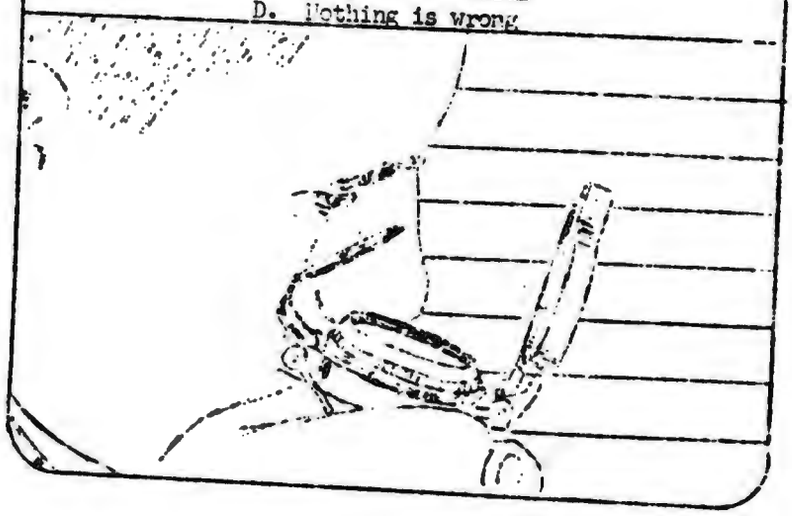
Slide C-11. What's wrong?

A. Eye too far from eye piece
B. Compass not level
C. Compass backwards
D. Nothing wrong



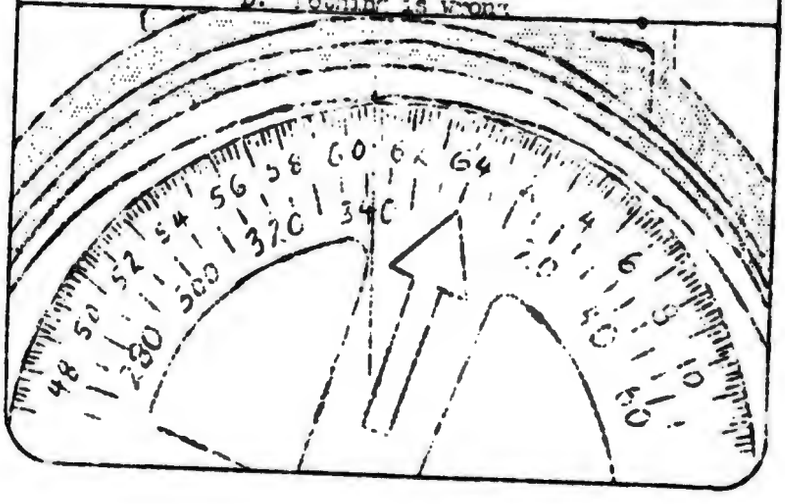
Slide C-12. What's wrong?

A. Eye too far from eye piece
B. Compass not level
C. Compass backwards
D. Nothing is wrong



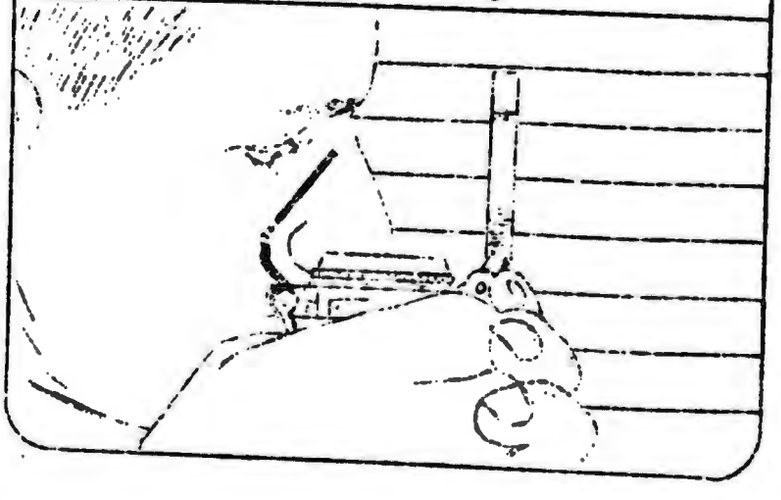
Slide C-13. What's wrong?

A. Eye too far from eye piece.
B. Compass not level
C. Compass backwards
D. Nothing is wrong



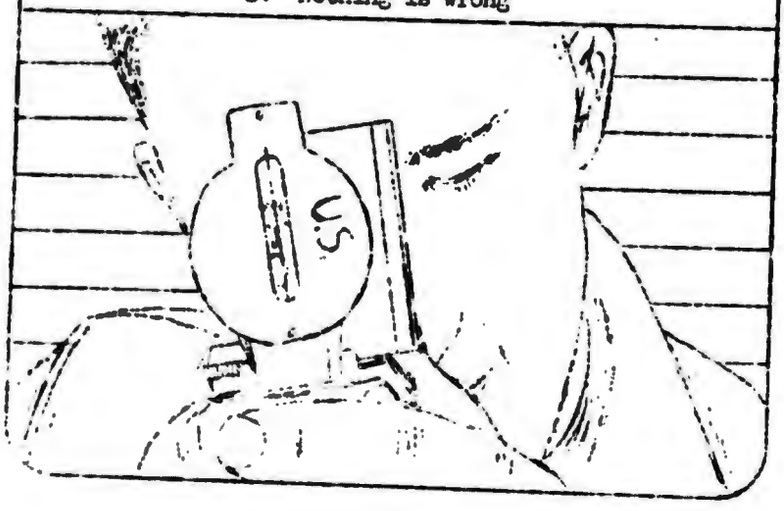
Slide C-14. What's wrong?

A. Eye too far from eye piece
B. Compass not level
C. Compass backwards
D. Nothing is wrong



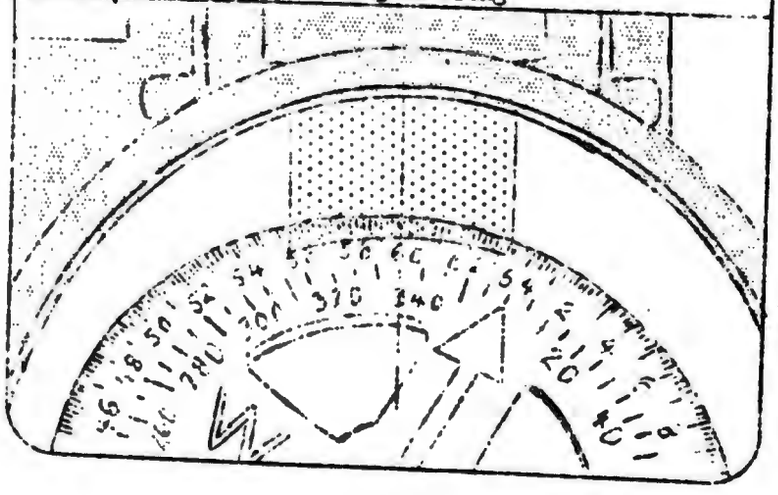
Slide C-15. What's wrong?

A. Eye too far from eye piece
B. Compass not level
C. Compass backwards
D. Nothing is wrong



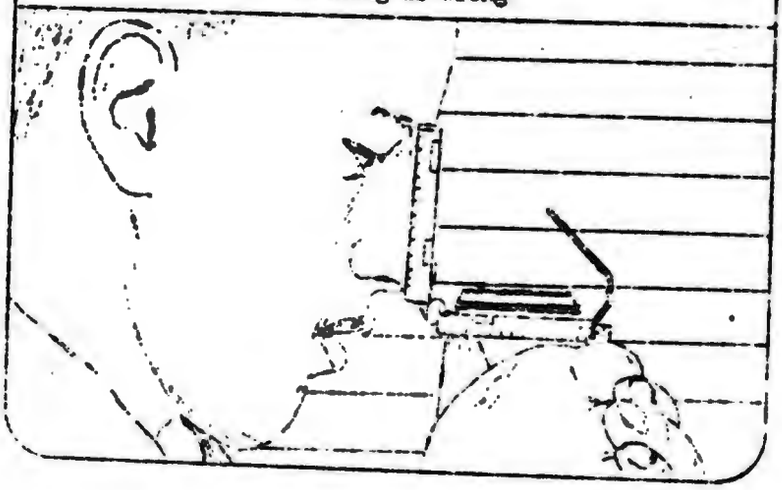
Slide C-16. What's wrong?

A. Eye too far from eye piece
B. Compass not level
C. Compass backwards
D. Nothing is wrong



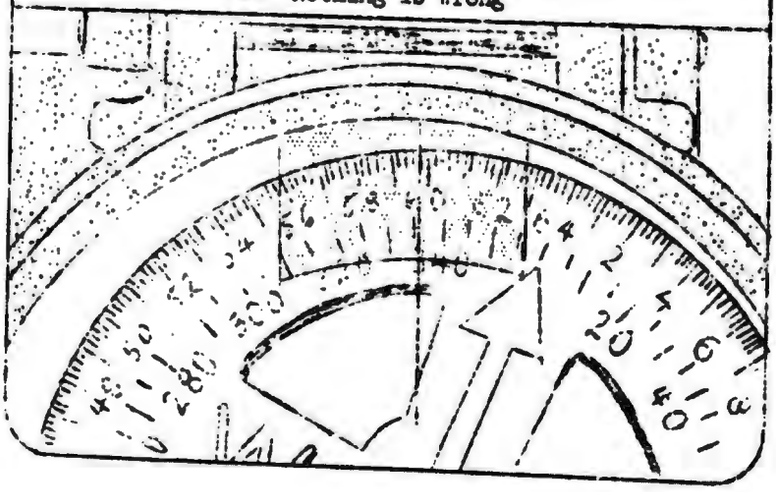
Slide C-17. What's wrong?

A. Eye too far from eye piece
B. Compass not level
C. Compass backwards
D. Nothing is wrong

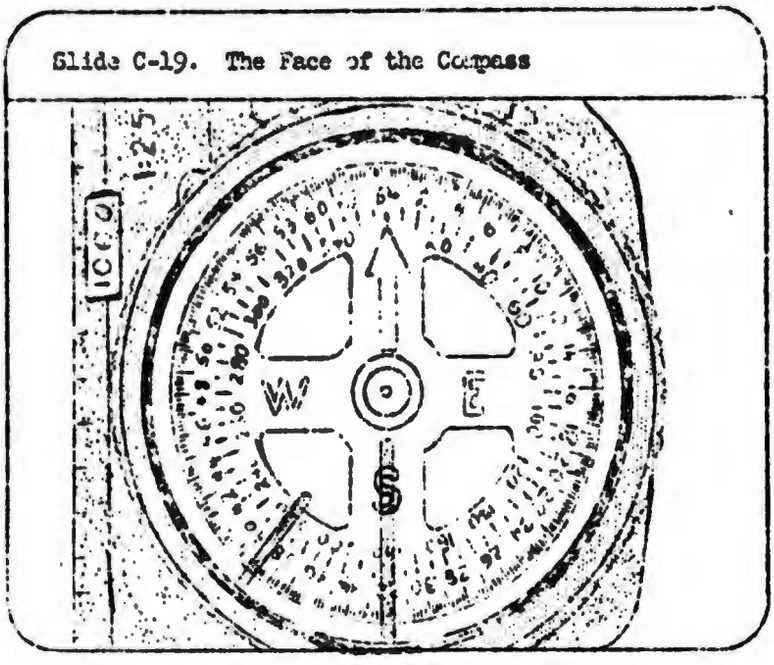


Slide C-13. What's wrong?

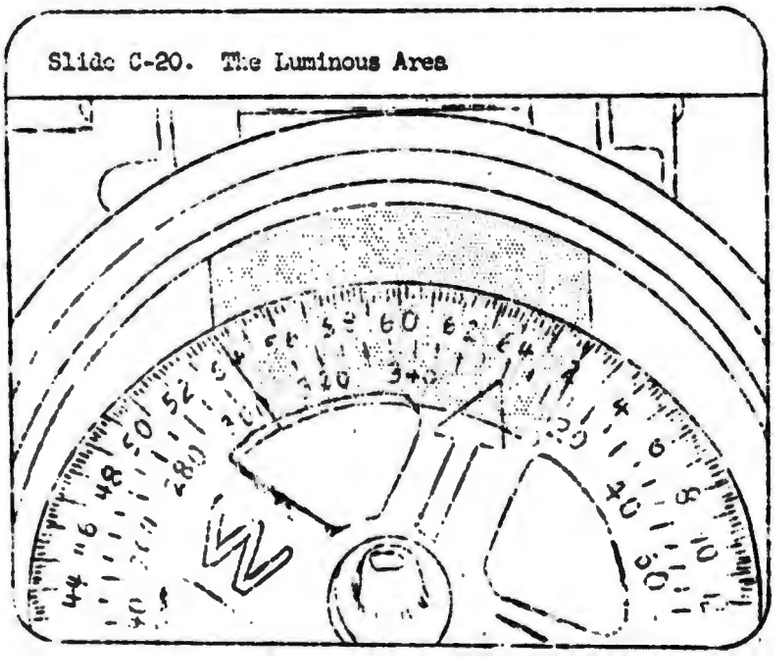
A. Eye too far from eye piece
B. Compass not level
C. Compass backwards
D. Nothing is wrong



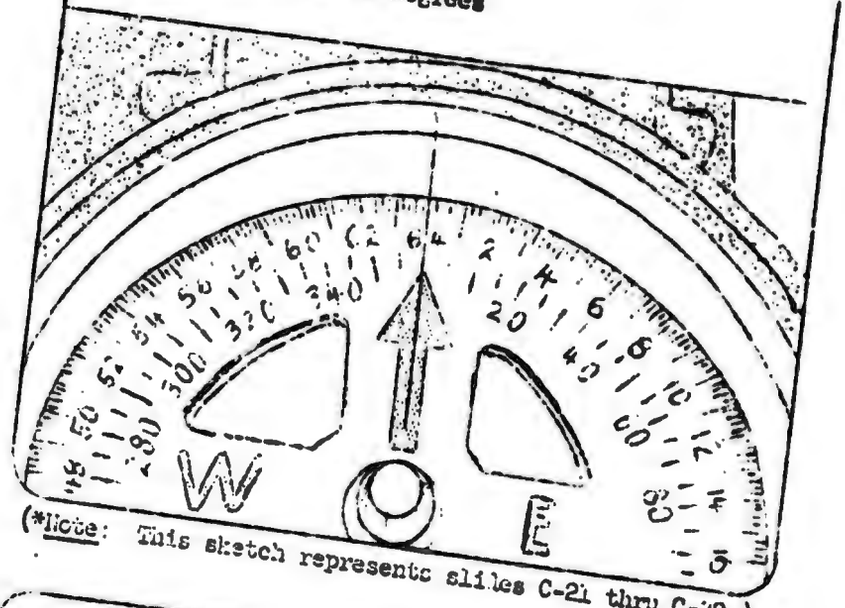
Slide C-19. The Face of the Compass



Slide C-20. The Luminous Area

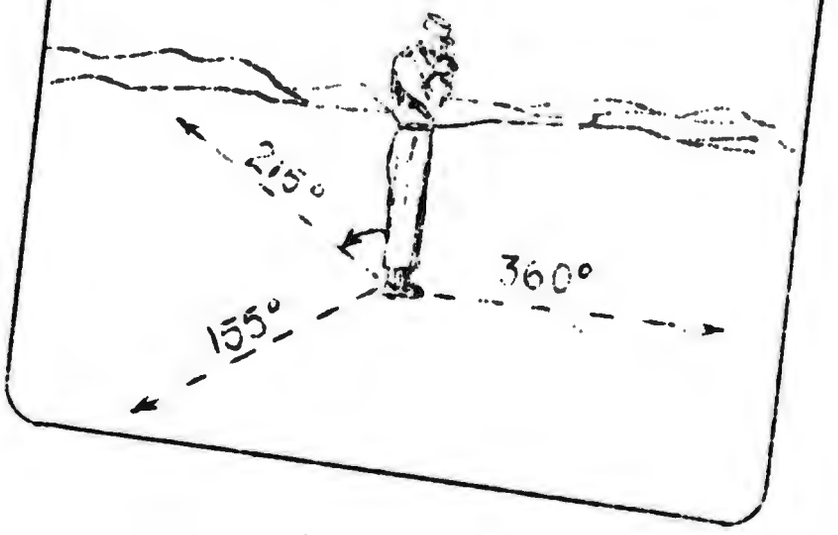


Slides C-21 thru C-32*
What Direction in Degrees

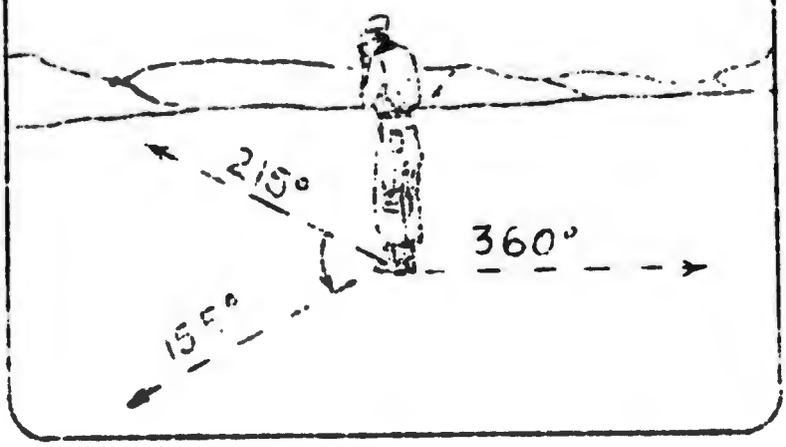


(*Note: This sketch represents slides C-21 thru C-32.)

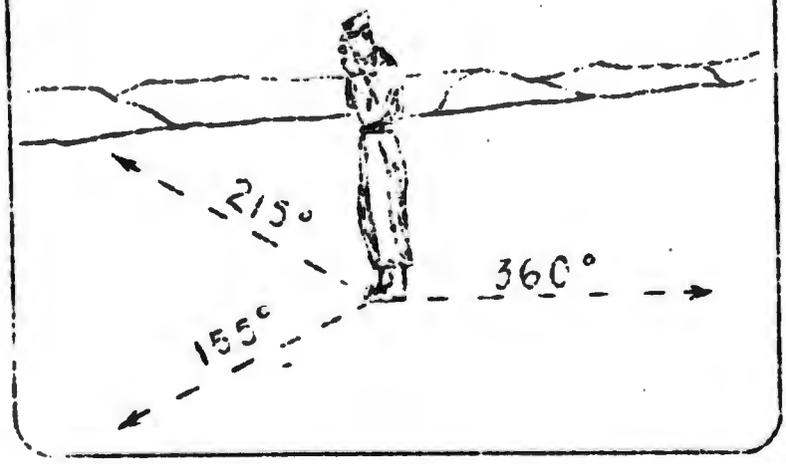
Slide C-33. Locating Assigned Azimuth



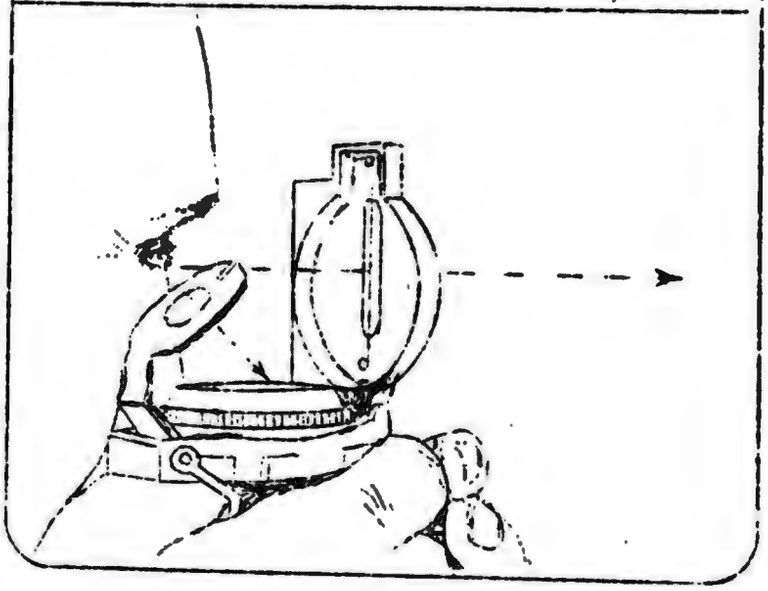
Slide C-34. Navigator Rotates



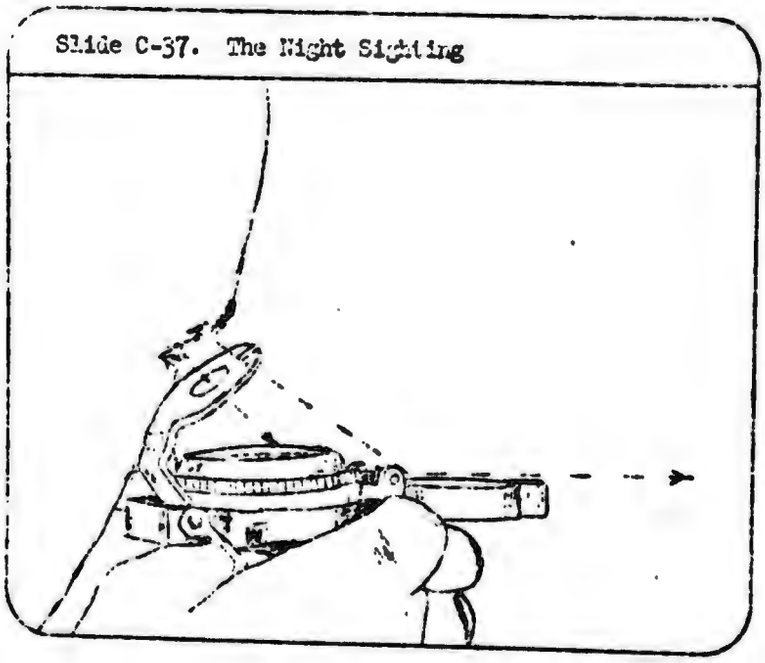
Slide C-35. Facing a New Assigned Azimuth



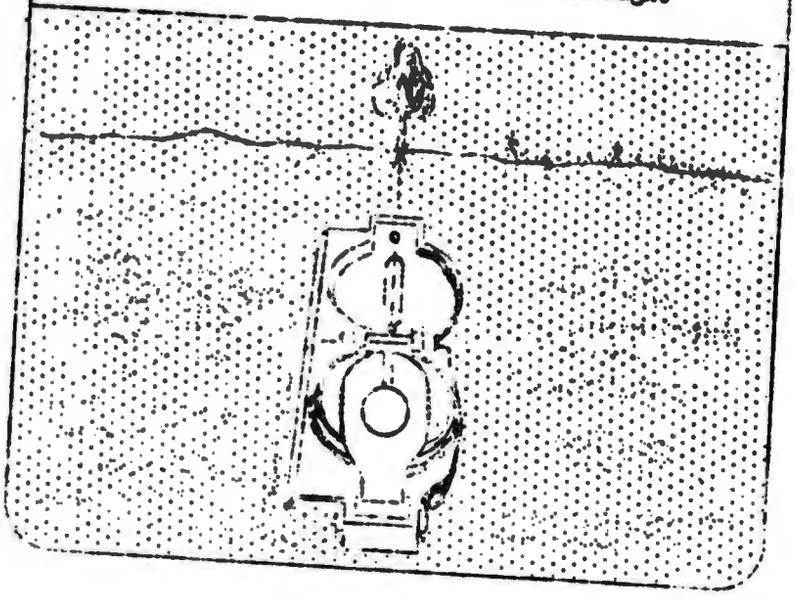
Slide C-36. The Day Sighting



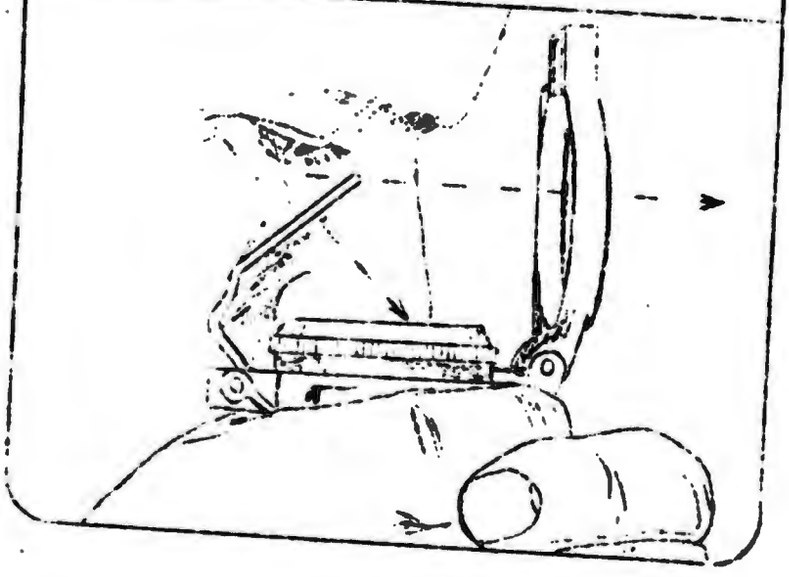
Slide C-37. The Night Sighting



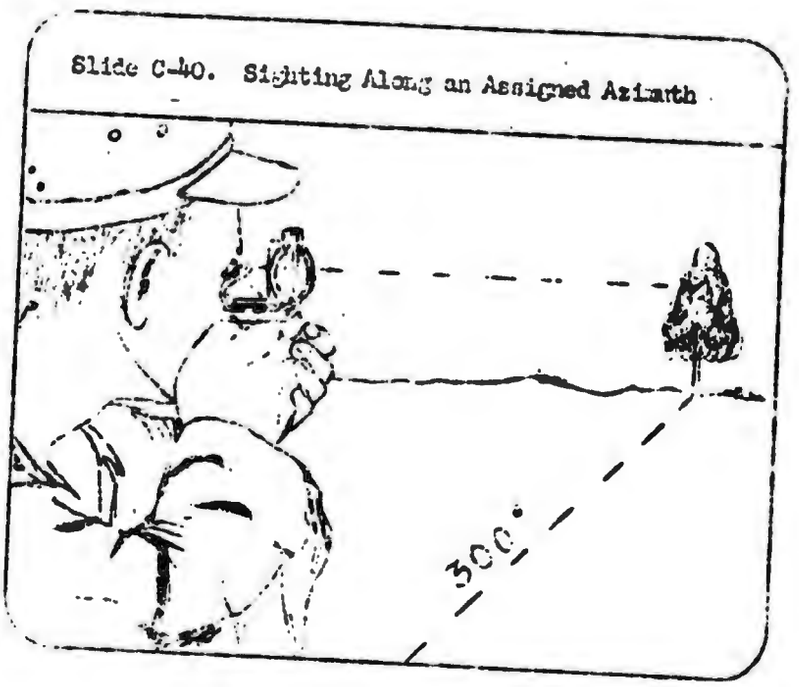
Slide C-38. Using the Luminous Dots at Night



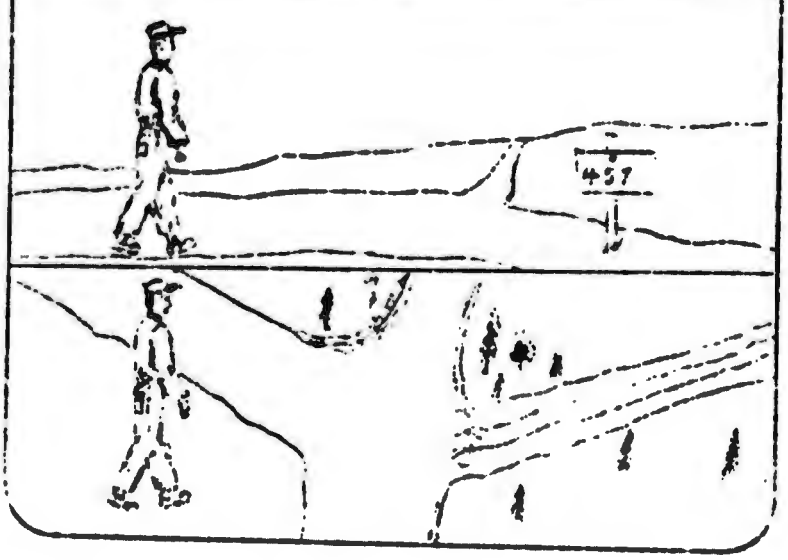
Slide C-39. Proper Use of Compass



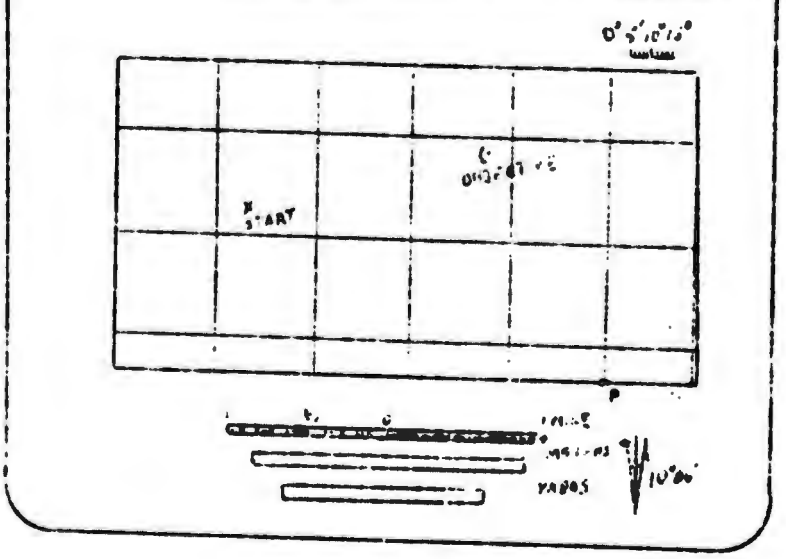
Slide C-40. Sighting Along an Assigned Azimuth



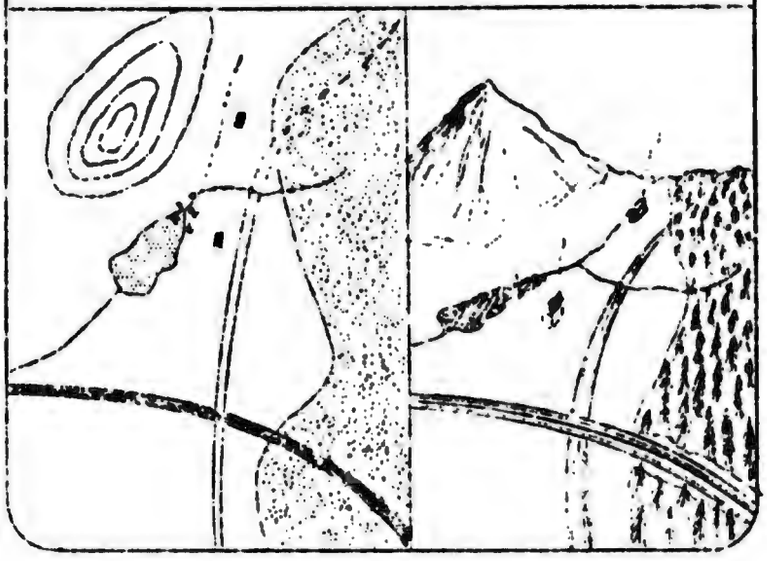
M-1 - The Checkpoint in Early and Later Training



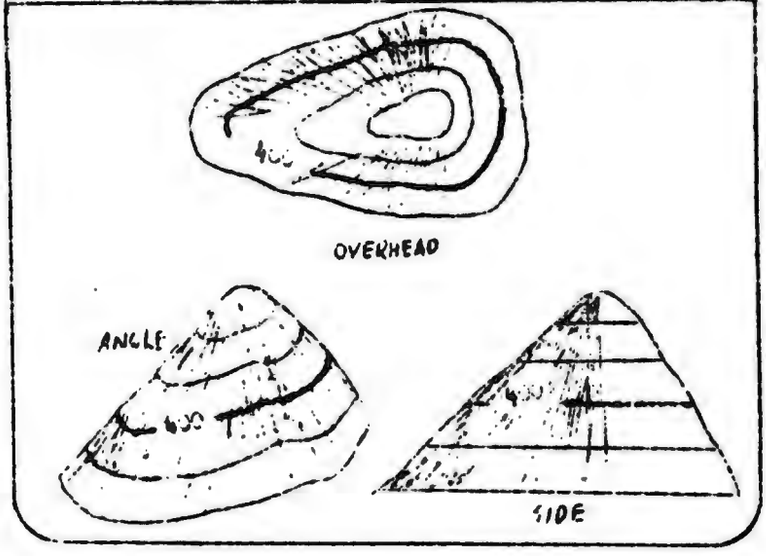
M-2 - The Map



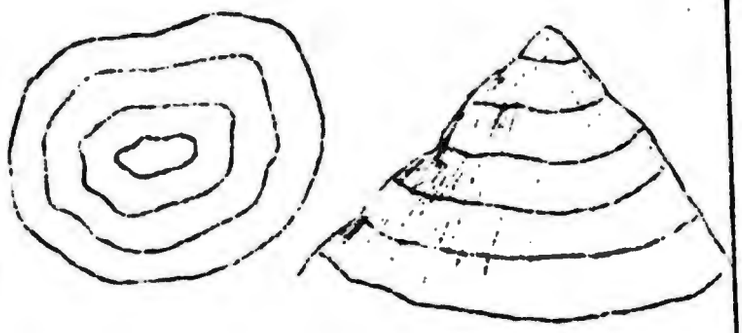
M-3 - Terrain Features vs. Map Symbols



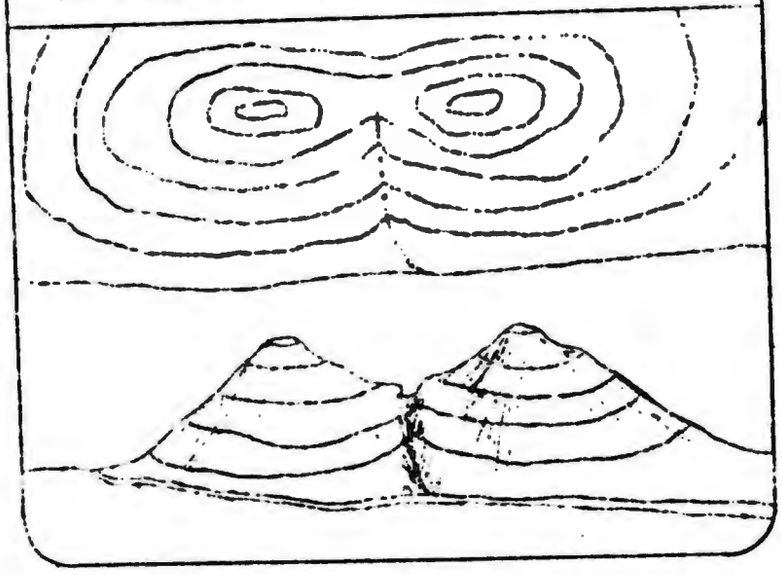
M-4 - Contour Indicates Slope



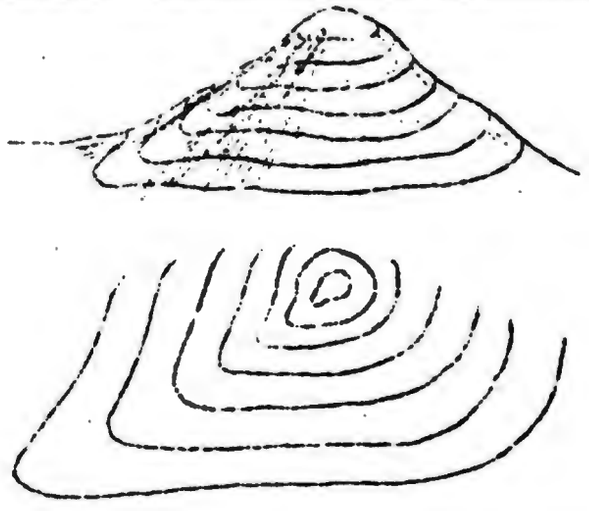
M-5 - Hill Contours



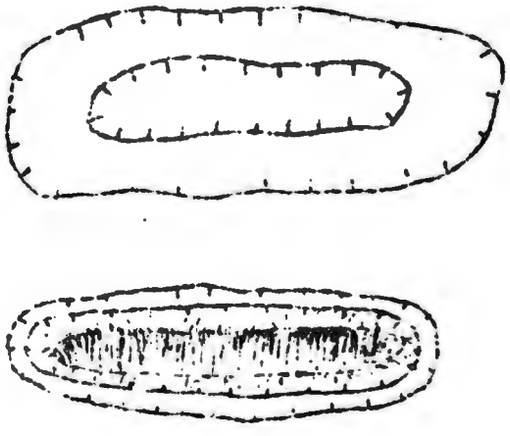
M-5 - Valley Contours



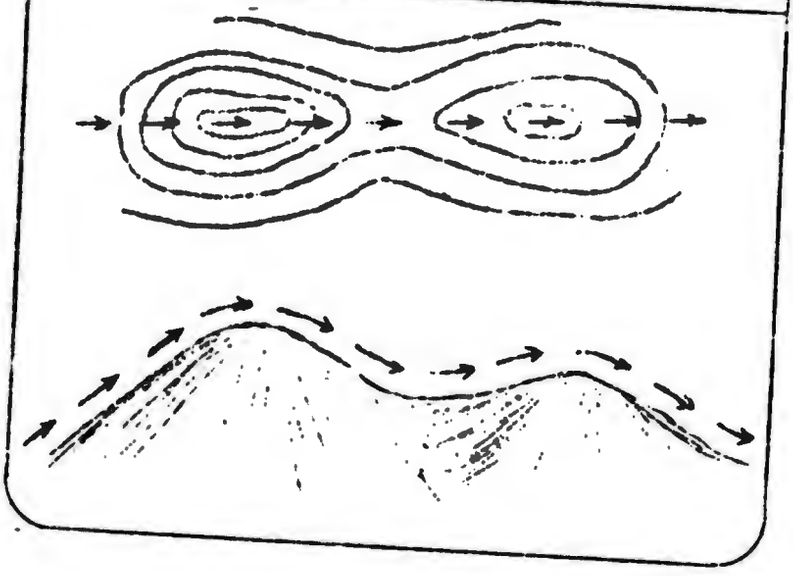
M-7 - Ridge Contours



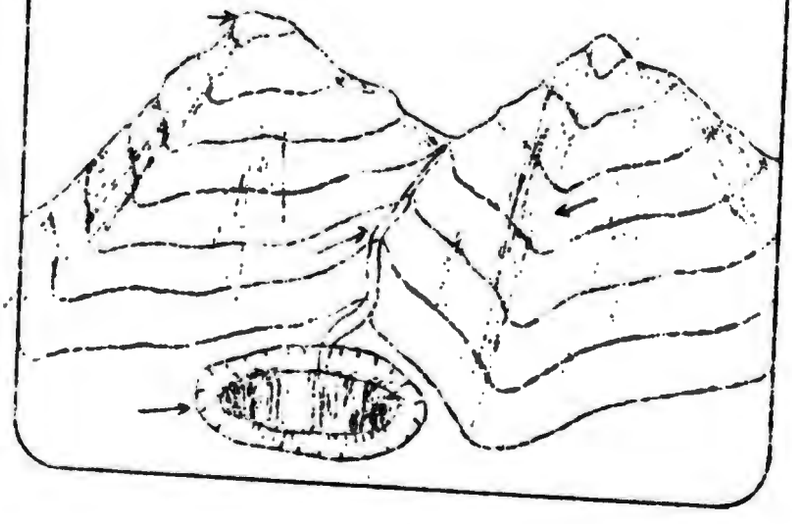
M-8 Contours of Depression



M-9 - Contour Interpretation

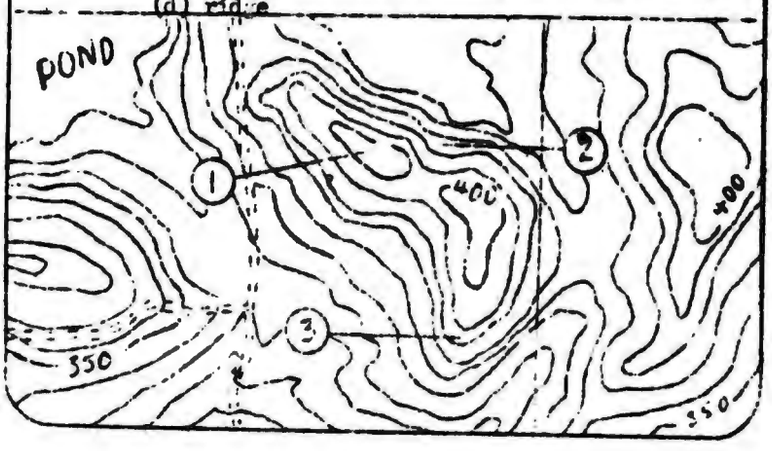


M-10 - Terrain Model with Contours



M-11 - DRILL. Which one of the following round forms is found at Point 1? At Point 2? At Point 3?

(a) hilltop (b) wet valley (c) dry valley (d) ridge



M-12 - DRILL. Same as M-11, but pinpointed are: depression, dry valley, stream.

M-13 - DRILL. Same as M-11, but pinpointed are: ridge, hilltop, depression.

M-14 - DRILL. Same as M-11, except use a flat, two dimensional map when photographing. The following points should be pinpointed: woods, swamp, lake.

M-15 - DRILL. Same as M-14, but pinpointed are: house, improved road, trail.

M-16 - DRILL. Same as M-14, but pinpointed are: ridge, dry valley, hilltop.

DF

USAIHRU Research Memorandum 7 December 1958

Addendum - September 1959 D-5070 A

The following information should be added to the addendum of United States Infantry Human Research Unit Research Memorandum 7, INSTRUCTOR'S GUIDE PATROL I, Land Navigation: Basic Instruction, dated December 1958.

Page 30, TRAINING AIDS

All references to Appendix II, Section II should be changed to Appendix II, Section I.

Page 32, par 2.a.(2)

Change: "Look at the number on the stake you are assigned to and look at the first number under the heading 'From number' on your scorecard."

To: "Look at the number on the stake you are assigned to and then look at the number under the heading 'From stake' on the front of your scorecards."

Add: (Note: All stake numbers, azimuths and letter clues will be recorded on the front and back of the scorecards prior to the start of the exercise.)

Page 33 d.(2)

Change: "If the number behind the letter clue and your seen number are the same, mark yourself correct by placing a "C" in the space to the right on your scorecard."

To: "If the number next to the letter clue and your seen number are the same, mark yourself correct by placing a "C" in the space to the right on your scorecard."

Page 34 g.(2)

Add: (Note: This movement changes the field of vision of the student, eliminating the possibility that he might memorize a letter clue while making his first three readings.)

Page 34 g.(3)

Change: "Check your scorecard and see if the second number under the reading 'From number' matches the number on the stake."

To: "Check the back side of your scorecard and see if the numbers under the heading 'From number' are the same as the number on your new stake."

Page 34 at the end of f

Add: (Note: All scorecards for this segment of instruction are filled out, front and back, prior to the class and there is no re-issue during the class. After the first 3 readings, students who have failed to get 3 correct readings move 9 stakes left to make additional readings. The new stake number corresponds with the number under "From stake number" on the back of their scorecard.)

Page 34 (immediately preceding "BREAK (10 min)"

Add: (Note: There are a maximum of six readings on the Compass Sighting Course. Students getting three consecutive correct readings on sightings 1-3 are excused from further participation on this course and report to the Sighting Range for supplementary training. Students who are incorrect on their first reading but get correct readings on sightings 2-4 also go to the Sighting Range for supplementary training. The balance of the students are given the remaining two readings and do not go to the Sighting Range.)

Page 52 1.f.

Change: "Follow this process until you complete the course, at which time your count should be 100."

To: "Continue this process until you complete the course."

Page 54 1.j.

Change: "Your count at the end of 100 meters should be 100."

To: "You have traversed 100 meters when your count is 100 and you have added your extra paces."

Page 96 3.a.

Change: "Immediately upon arrival at the field training area, AI's

3 and 4 proceed to the initial objective, erect their light screens (ponchos), and report arrival to AI's Nr 1 and 2."

To: "Immediately upon arrival at the field training area, AI's 3 and 4 proceed to the line of tape 75 meters beyond the initial objective, erect their light screens (ponchos), and report arrival to AI's Nr 1 and 2."

Page 150-152, Table V

All distances should be changed from 100 meters to 115 meters.

Page 151-152, Table V

All objectives listed as being to the left of the North Start Stakes should have been listed as being to the right and vice versa.

Page 161

The contour exercise shown should appear as the first item on answer sheet on page 160 and should be titled "Terrain Model Without Contours."

Page 171

Add: "(8) The route information card of all subjects gives the same azimuth and distance from the initial objective "A" to the line of tape. Therefore, if there were no deviations while traveling the course, all students would come upon Panel Nr 7."

Included are pages 270-279 which were omitted from the report by mistake.

PRESTON S. ABBOTT
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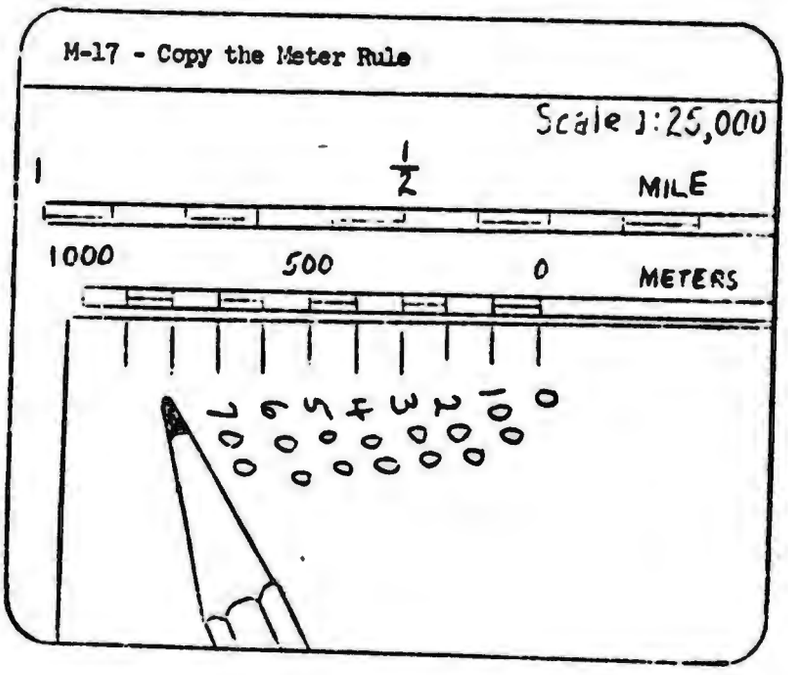
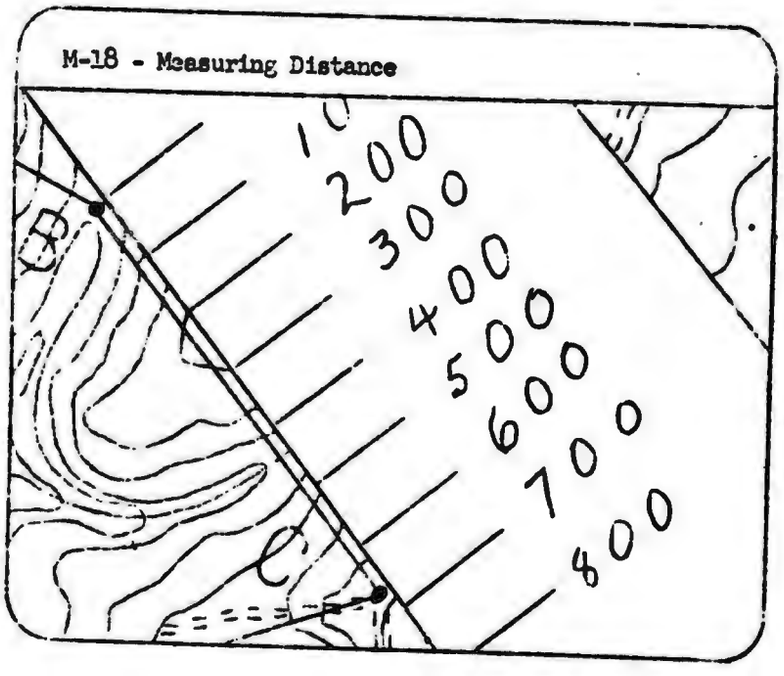
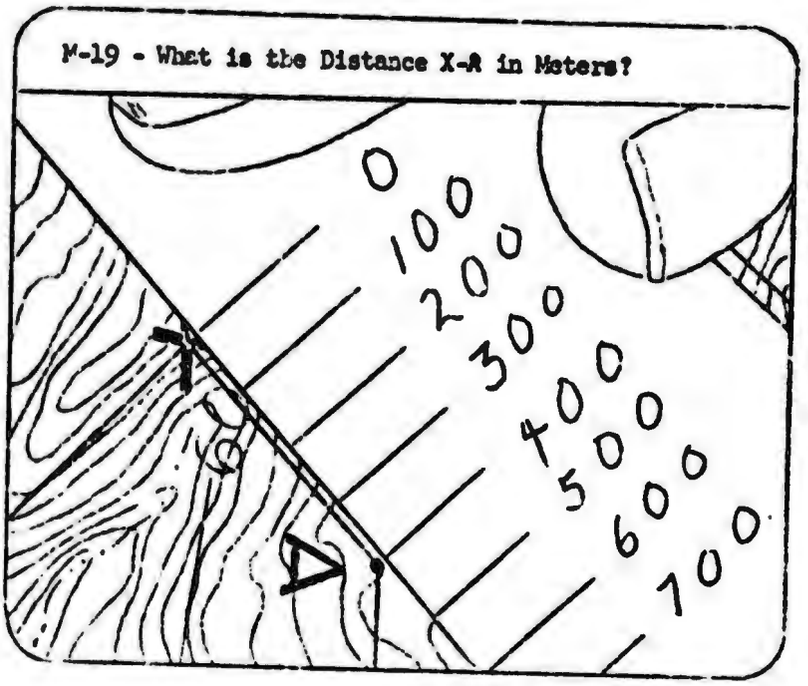
M-17 - Copy the Meter Rule



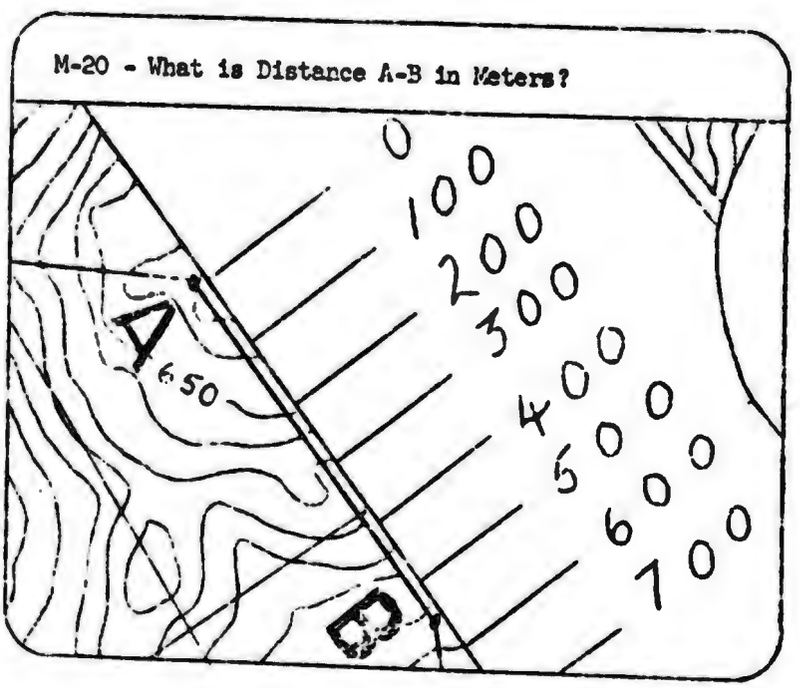
M-18 - Measuring Distance



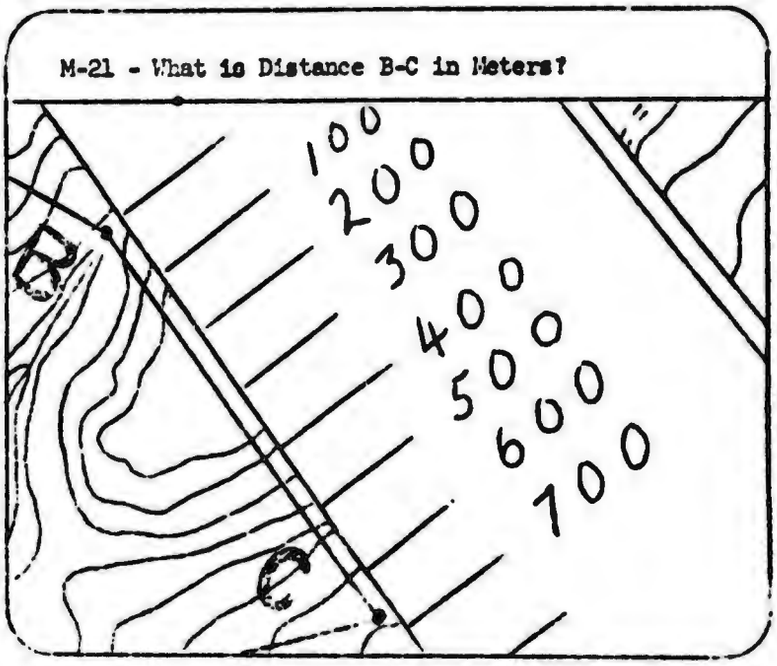
M-19 - What is the Distance X-A in Meters?



M-20 - What is Distance A-B in Meters?



M-21 - What is Distance B-C in Meters?

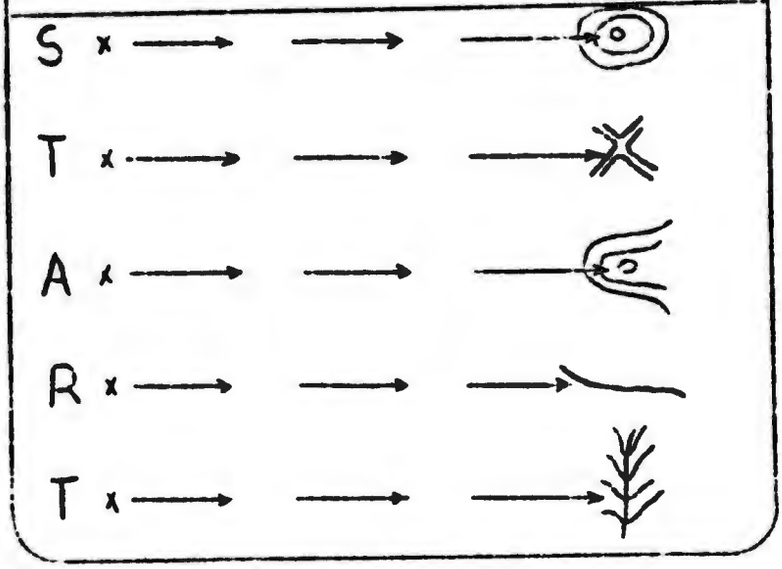


M-22 - Map Symbols (Review) - Same as M-3.

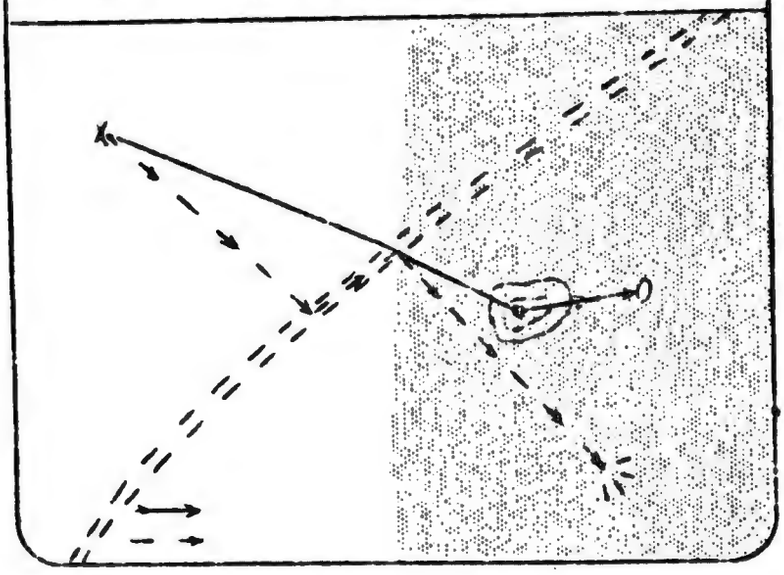
M-23 - Terrain Model With Contours (Review) - Same as M-10.

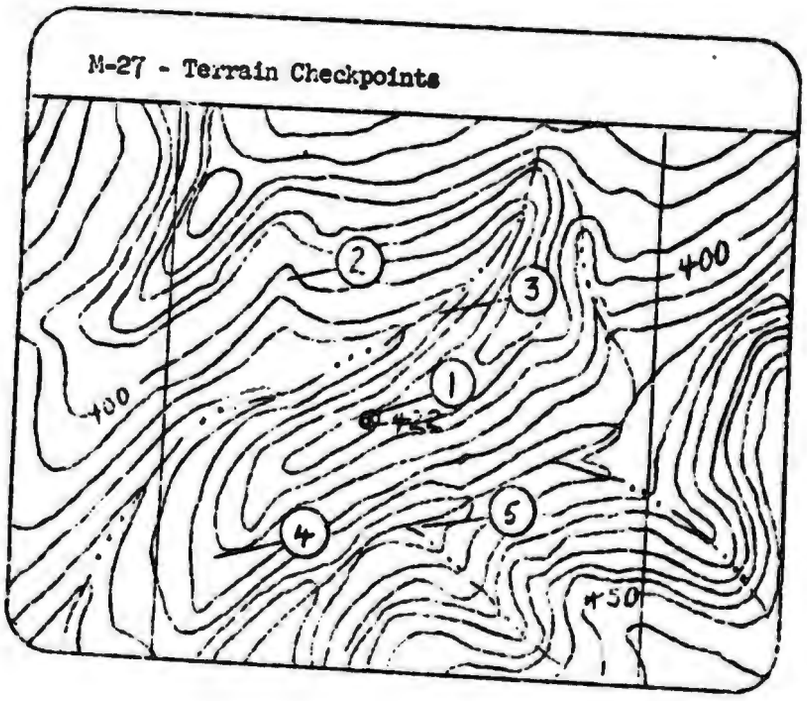
M-24 - Copy the Meter Rule (Review) - Same as M-17.

M-25 - Correction Value of Checkpoints



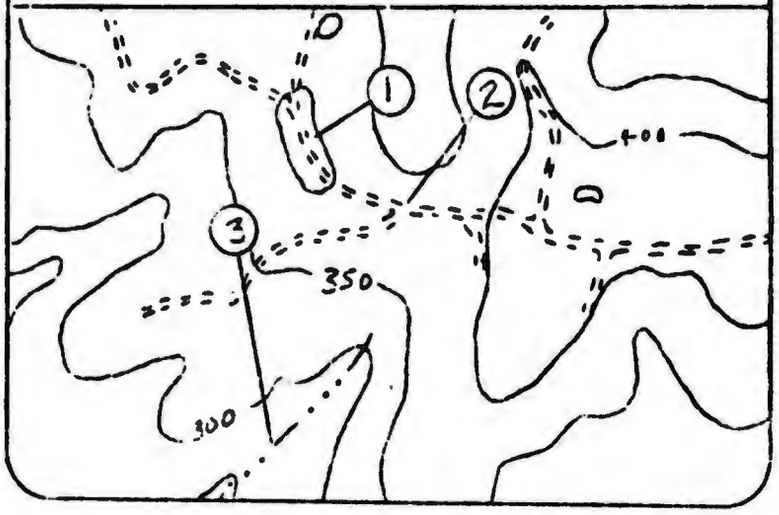
M-26 - A Checkpoint Aids Navigation





M-28 - Checkpoint Composition - Same as M-3.

M-29 - DRILL. Which one of the following checkpoints is found at Point 1? At Point 2? At Point 3?



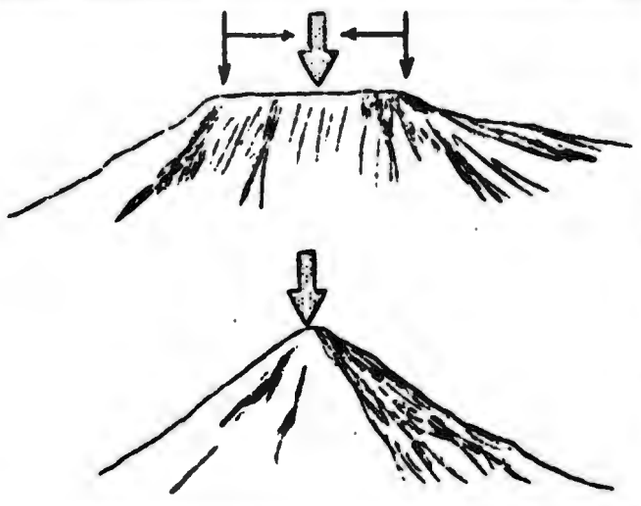
M-30 - DRILL. Same as M-29, but with dry valley, house on woodline, and junction of two streams pinpointed.

M-31 - DRILL. Same as M-29, but with house on road, hill-top, and ridge pinpointed.

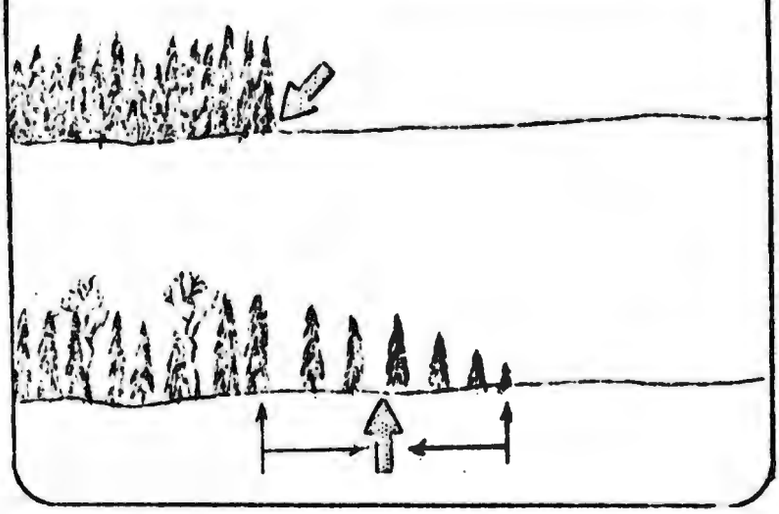
M-32 - DRILL. Same as M-29, but with stream and pond, stream and depression, and stream and road pinpointed.

M-33 - DRILL. Same as M-29, but with junction of two wet valleys, house on stream, and dry valley pinpointed.

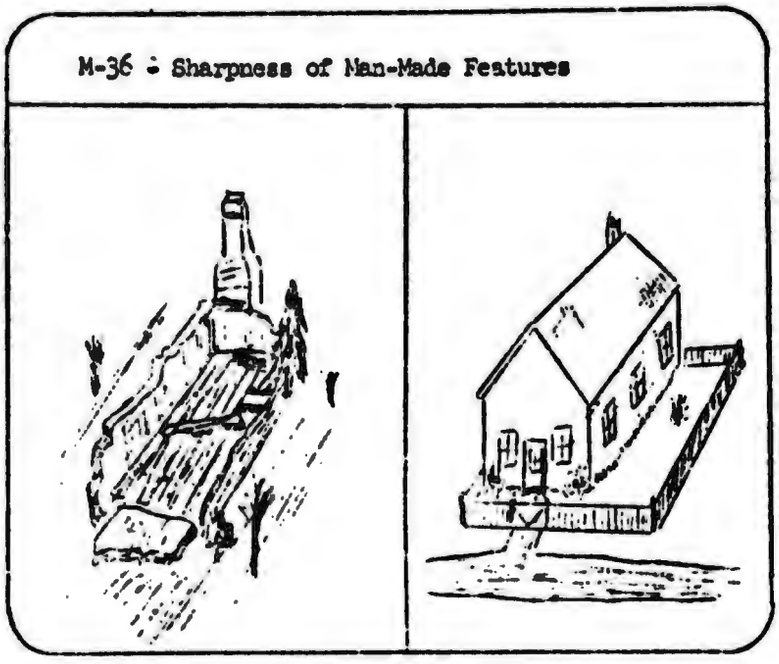
M-34 - Sharpness of Slope



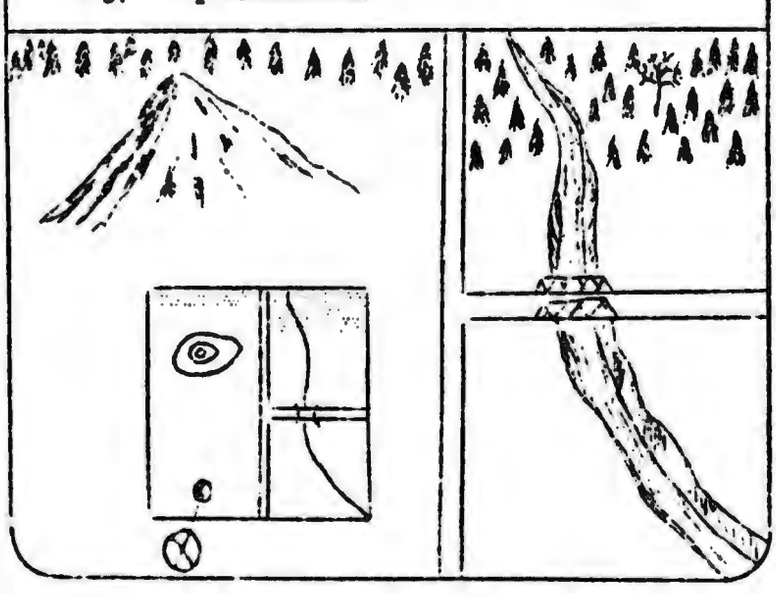
M-35 - Sharpness of Woodline



M-36 - Sharpness of Man-Made Features

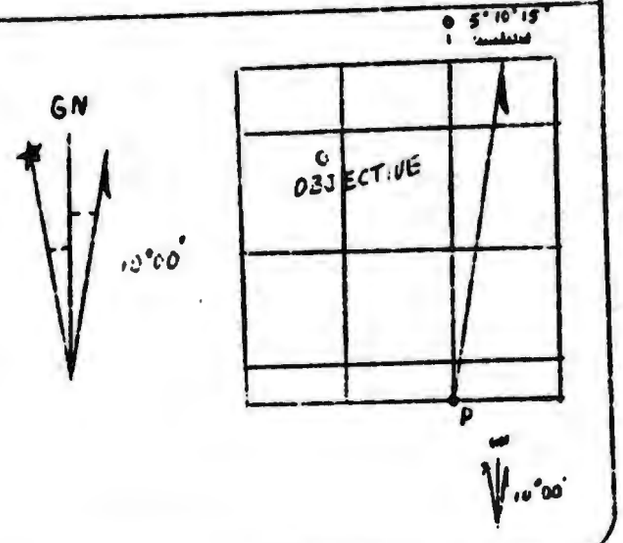


M-37 - Map Orientation

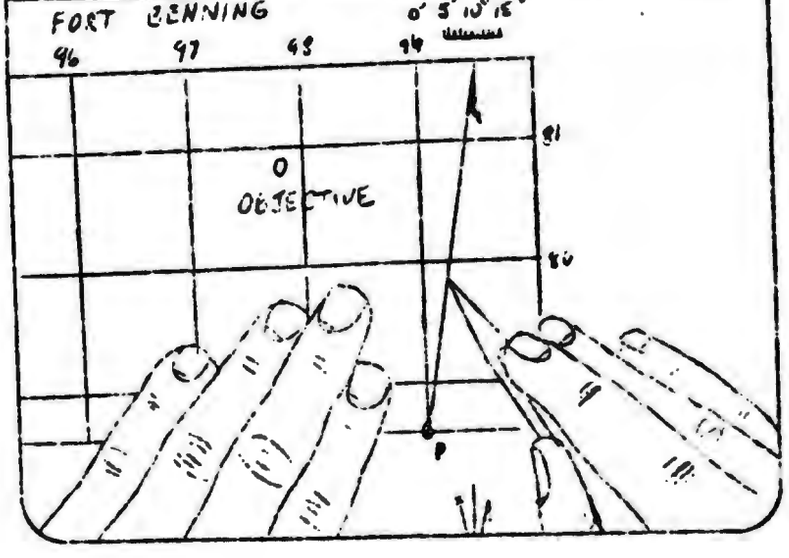


M-38 - The Map - Same as M-2.

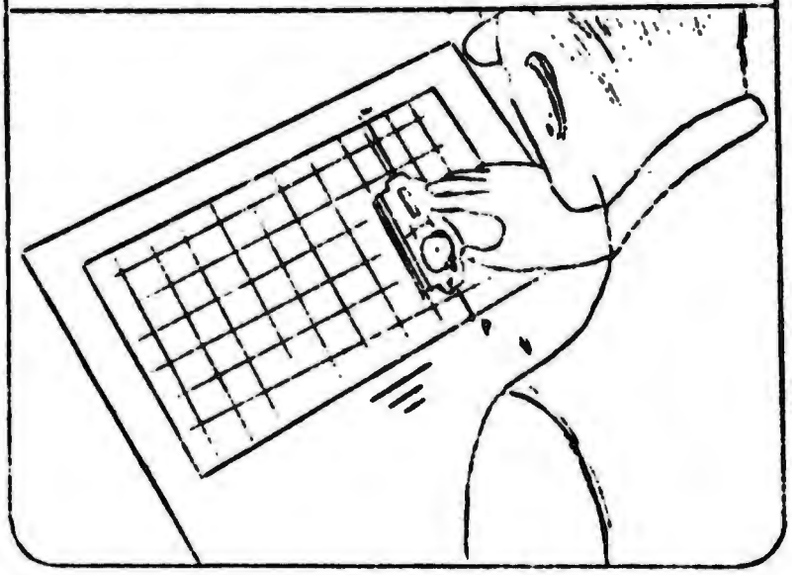
M-39 - Magnetic North Scales



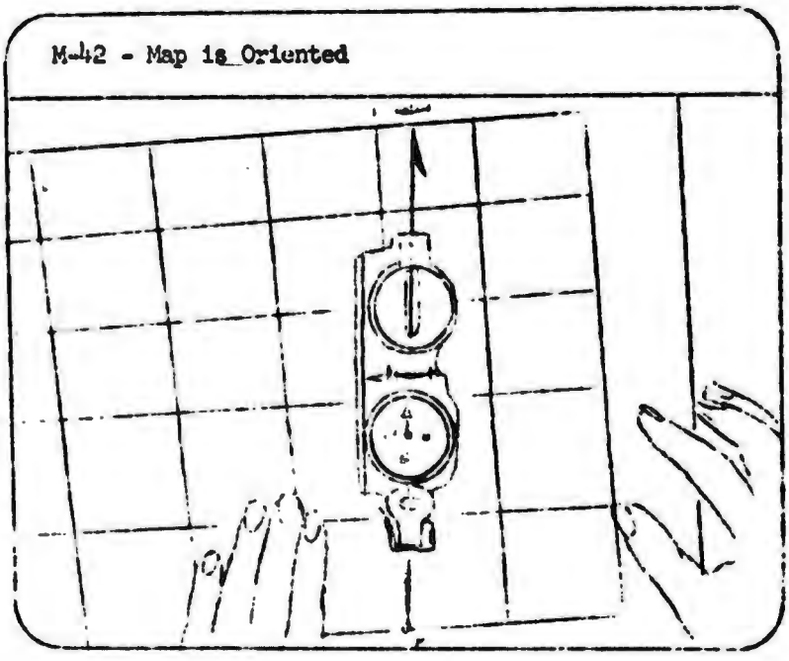
M-40 - Draw Magnetic North Line



M-41 - Map is Lined Up With Compass



M-42 - Map is Oriented



M-43 - Correction Value of Checkpoints (Review) - Same as M-25.

M-44 - Sharpness of Woodline (Review) - Same as M-35.

M-45 - Draw Magnetic North Line (Review) - Same as M-40.

M-46 - Map is Oriented (Review) - Same as M-42.